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Lasca Leaves

Published quarterly by the California Arboretum Foundation, Inc., for the Department of Arboreta and Botanic Gardens of Los Angeles County.

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Editor
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Cover photo by Francis Ching

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department notes

ANNIVERSARY BANQUET

THE BANQUET marking the 25th anniversary of the signing of the articles of incorporation of the California Arboretum Foundation, held last February 20th in the Mediterranean Room of the Brookside Clubhouse in Pasadena, turned out to be a gala affair. The setting was suitable to the occasion, the room, attractive by itself, set off by a number of dramatic container plants borrowed from the Arboretum nursery and each table highlighted by a three-foot-high antiqued compote containing roses, mums, babysbreath, and a spray of peacock feathers, the work of Mrs. Philip Brueckner, a committee of volunteers, and Mr. John Provine, Arboretum horticulturist. With Mr. F. Harold Roach, past president of both the California Arboretum Foundation and the Board of Governors of the Los Angeles County Department of Arboreta and Botanic Gardens serving as emcee, close to 175 guests heard Dr. Frits W. Went, founding president of the Foundation — who had come over from the Desert Research Institute in Nevada for the occasion — open the program with reminscences of the early days. Dr. Went said he was "amazed and delighted to find so many of the original plans for development already achieved." Mr. Kay Iizuka, current president of the Board of Governors, presented on behalf of that body a future pool and fountain, inscribed with a bronze plaque, to be constructed in the Arboretum entranceway. State Senator H. L. Richardson presented a scroll from the State of California, and Mr. Roach presented a scroll from the Board of Governors on behalf of Supervisor Peter Schabarum who was unable to attend.

Of the eleven original signers of the articles of incorporation, three — Dr. Samuel Ayres, Jr., Mr. Howard Miller, and Dr. Frits Went — were on hand to receive honorary life memberships and copies of a limited-edition printing of a history of the first twenty-five years of the Arboretum written by Mr. George Spalding, longtime staff member and currently botanical information consultant. The honorary memberships and numbered books — the first copy was given to Dr. Ayres to whom the book is dedicated — were presented by Mr. John Anson Ford, former county supervisor, who preceded the presentations with some of his own recollections of the founding days and the people who took part in them, ending his remarks with the hope that "this beautiful Arboretum and the city of Los Angeles, to which the Arboretum has contributed so much, will serve as models for urban beautification in cities in all parts of the world." Then he presented books, along with a few gracious remarks, to Mrs. Georgina Mage, Mrs. Forrest Stanton, Mrs. Ralph Cornell, and Mr. Spalding. He also introduced Mrs. Harry Robinson, taking note of her generous offer to the County, described elsewhere in these notes. Mrs. Peter Douglas, Foundation president, presented copies of the book to former Foundation presidents Dr. Arie Haagen-Smit and Mr. Ernest Hetherington, and to the Foundation's Executive Secretary, Mrs. Dolores Hubbell, and to Department Director Francis Ching. Following a few closing remarks by Mr. Ching, Mr. Roach thanked everyone for having come and another milestone in the history of the Los Angeles State and County Arboretum passed into the records.

Left to right: Frits Went, John Anson Ford, Samuel Ayres, Jr.

At the Anniversary Banquet

F. Harold Roach and Mrs. Peter L. Douglas

Arie J. Haagen-Smit

Howard Miller and John Anson Ford

Mrs. John R. Mage

Kay Iizuka

Francis Ching and Mrs. Harry W. Robinson

Samuel Ayres, Jr., and George Spalding

Senator H. L. Richardson and Mrs. Peter L. Douglas

Mrs. Forrest Q. Stanton and John Anson Ford

Mrs. Philip Brueckner, John Provine, and Mrs. William Eilau

Photos at the Anniversary Banquet: By Marilyn Morrison: page 5, top and bottom left; page 7, top; page 8, right. By William Aplin: page 5, bottom right; page 6; page 7, center and bottom; page 8, left.

NEW GOVERNORS

WE WISH to welcome and extend our best wishes to new members of the twenty-five member Board of Governors. They are Mrs. Marilyn C. Stoke of Arcadia appointed by Supervisor Pete Schabarum, and Mr. Edward Engoron of Los Angeles, appointed by Supervisor Ernest Debs.

AABGA MEETING

NEXT MONTH the Arbortum will be the host for the annual meeting of the American Association of Botanical Gardens and Arboreta. For four days, April 16-19, conferees will be busy with field trips to other Southern California gardens and with symposia held at the Arboretum. At the talks particular attention will be given to the various kinds of educational programs and how they serve the community.

CONTEST AT SOUTH COAST

HAVING DECIDED that its brochures, stationery, posters, and other forms of public communication would be aided by an eye-catching logo of some sort, the South Coast Botanic Garden Foundation has come up with a plan that promises not only to produce the desired result but includes worthwhile side benefits. The essence of the plan, as worked out by the Foundation's enterprising publicist, Helen Pickett, is to tap the imaginations and skills of art students in 47 of the area high schools by inviting them to enter a contest for the logo that best represents the Foundation's purposes. The winning logo will be selected on the basis of design and relevance. The winning school will receive a tree, the winning student a $100 savings bond. The awards will be made following the Sunday morning garden walk on April 29th. The side benefits, of course, are the involvement of students in the concept of public service represented by the Foundation and bringing to their attention a botanic garden they might otherwise pass by.

DESCANSO BIRDHOUSE

THE DESCANSO Gardens Guild is the recipient of an award from the San Fernando Audubon Society presented to Mrs. John Crowley, Guild president, at a ceremony last January 21st in the Rose Garden. The award, in the form of a plaque that now hangs on a wall in the library of the Hospitality House, expresses the society's appreciation for the Guild's efforts in maintaining and refurbishing the Bird Observation Station. The Guild provided outdoor carpeting so as to muffle footsteps and thus not disturb the birds, new screens and a higher fence, also so as not to disturb the birds, and painted the interior white, this last purely for the benefit of visitors.

Planned for the future are weekend staffing by Audubon members, the development of a small museum, and counter sales of bird-feeders, and the like. Paul Howard, western regional representative of the National Audubon Society, and Francis Ching, Arboreta and Botanic Gardens department director, were among the speakers who took note of these achievements, after which everyone repaired to the Hospitality House for tea.

ROBINSON ESTATE

ONE OF the most impressive showplaces in Beverly Hills, the eight-and-a-half-acre garden estate of Mrs. Harry Winchester Robinson, may one day become a part of the Los Angeles County Department of Arboreta and Botanic Gardens. Earlier this year Mrs. Robinson offered to donate her estate to Los Angeles County for use as a botanic garden after her death. Aware that transferring a private garden to the public sector is not as easy as it once was, Mrs. Robinson accompanied her generous offer with an equally generous offer to provide a one million dollar endowment for maintenance of the property. County Chief Administrative Officer Arthur Will and Arboreta Director Francis Ching are in the process of reviewing the offer in accord with a directive of the Board of Supervisors. Mrs. Robinson's husband was the president of the J. W. Robinson Department store from 1924 until his death in 1932. Over the years he had collected ferns and rare tropical plants, developing one of the finest collections in the West. In making her offer to the county, Mrs. Robinson, who is 95 years old, said she was motivated by a wish to perpetuate and expand the collections.

BONANZA AND A FROLIC

THE DATES and the form have been established for the 1973 versions of two of the California Arboretum Foundation's happiest and most effective fund-raising affairs — the Baldwin Bonanza and the Queen Anne Frolic. The Bonanza will take place on April 1st from 9:30 a.m. to 4:30 p.m. in the Demonstration Home Gardens. According to chairwoman Ruth Mary Larson, the event will focus on a plant sale that will include many of the Arboretum's introductions, and will be highlighted by booths offering gardening consultant service, demonstrations on how to plant terrariums, herb, fern, and hanging basket displays, and some select antiques. As an added fillip there will be a Gross Contest in which anyone, for one dollar a guess, can estimate the final gross proceeds, the winner to get free libations and food at a celebration party after the event. A members-only preview is scheduled for the night before, March 31st.

Foundation member Alice Coulombe is chairing the Queen Anne Frolic which, she reports, is an evening affair set for Friday, September 28th. Guided by the most popular attractions of the first frolic, Mrs. Coulombe has plans for tours through the Queen Anne Cottage, rides around the grounds in antique cars, two dance bands, and a barbecued roast beef dinner.

UNDERGROUND POWER

FOR YEARS an overhead power line crossing Lasca Lagoon and through the historical section has been an eyesore, a hazard, and a source of inadequate power to the mall area, an area that frequently needs good lighting and outlets for public address systems and other power-consuming conveniences. Now, through the cooperative efforts of the County Mechanical Department, Southern California Edison, and our own staff, these are conditions of the past. Approximately 3,000 amps are available to the Arboretum at several strategically located control panels, and the power line that crossed Lasca Lagoon and other areas is now underground in a 1500-foot ditch dug by the Arboretum service crew.

ATTENDANCE

AS THE history of the Arboretum printed in this issue reveals, attendance has increased every year since its inception, save for one or two years when extended periods of rain kept people at home. But this past year attendance at the Arboretum reached an all-time high of 637,474, a figure representing the greatest yearly increase, 17.2 percent, to date.

Adding together a 35% increase at South Coast Botanic Garden and a 9% increase at Descanso Gardens, total attendance for 1972 at the Department's three gardens came almost to 1.2 million.

ANNUAL MEETING

AT THE annual meeting of the California Arboretum Foundation next May 8th, the outdoor luncheon will be enlivened by a fashion show in which Foundation members will model women's clothes of the Baldwin era all the way from coats, dresses, and boas down to the unmentionables, plus a collection of functional garden clothes that the models themselves will wear when they toil in the Arboretum's new Garden For All Seasons.

A HISTORY OF THE LOS ANGELES STATE AND COUNTY ARBORETUM

THE FIRST 25 YEARS

By

GEORGE H. SPALDING

Edited by Davis Dutton

with a

Foreword by W. W. Robinson

FOREWORD

One man's good idea caught fire, and the result was the development in Southern California of the Arboretum at Arcadia, today a complex of great botanical and historical fascination and importance. The year 1973 marks the Arboretum's twenty-fifth aniversary, the articles of incorporation of the California Arboretum Foundation, Inc. having been signed on February 20, 1948. The idea and the dream of an Arboretum go back even farther.

George H. Spalding, the Arboretum's first superintendent and a member of the staff almost from the beginning, tells the story from the Hawaii-born idea of Dr. Samuel Ayres, Jr., up to the present. He tells it as an eyewitness of the activities of all the individuals who have shared in the fruition of Dr. Ayres' idea, including the officers and staff members and specialists who have contributed their knowledge and their skills, and the volunteers who have lent happily their thinking, their time, their labors—and their funds—to furthering the purposes of the Los Angeles State and County Arboretum. The story is not only a botanical one, but one that enters the field of California history, for the Arboretum's 127 acres lie on historic ground that was once part of a Mexican land grant—Rancho Santa Anita—the best known owners of which were the Southern California pioneer, Hugo Reid, and the California tycoon, E. J. "Lucky" Baldwin. Buildings representing both these men and their eras are on the Arboretum grounds.

My own close experience with the Arboretum came through serving as secretary (with Lindley Bynum as "co-secretary") on Susanna Bryant Dakin's historical committee. Supplementing George Spalding's account, I should mention that this gently persuasive woman of wide interests, and her longtime Pasadena friend, Georgina Hicks Mage, as "co-chairman," plus the other committee members, the architects and other experts, carried out the restoration or reconstruction of the existing historic buildings. Meetings were held mostly outdoors in the fairyland setting developed by the various nineteenth-century owners of Rancho Santa Anita, beneath the shade of towering eucalyptus trees or alongside Baldwin Lake. Under Susanna's deft administration the meetings were extremely informal, were closed with food and drink, and occasionally were supplemented with cocktail parties at the home of Georgina Mage or at the Valley Hunt Club. My first minutes, covering the first meeting, were dated March 19, 1949. It was a rainy day, and the meeting was held on the porch of the Hugo Reid Adobe. The last meeting of this committee was held on December 16, 1960, my minutes revealing that Dr. Stewart was requesting, in the budget, the creation of the position of "historical curator" and concluding with the phrase "whereupon the Committee adjourned to New Almaden sherry and cookies assembled by Mrs. Elsie Murray."

George H. Spalding's broad coverage of the Arboretum's history comes at the celebration of the Arboretum's Silver Jubilee Year. To those of us who, like George Spalding, have been associated with its development from the beginning, and to the many who have given of their time and talent along the way, there is a tremendous satisfaction in viewing the results as we see them today.

W. W. Robinson
Los Angeles, 1972

I

PLANTING THE SEED

The First Twenty-Five Years

How did the idea, the dream of an Arboretum for Southern California, become a reality?

In 1939, Dr. and Mrs. Samuel Ayres, Jr., made their first trip to Hawaii and had their first glimpse of the island's wealth of flowering trees and shrubs. For Dr. Ayres, a successful Los Angeles dermatologist by profession and a confirmed horticulturist by avocation, the trip had a lasting impact—"an impact," in Ayres' own words, "which has never been forgotten.

"Plants, particularly colorful plants, have always interested me," Ayres today recounts. "In fact, during the time I was growing up in the Midwest, when the other kids were selling lemonade, I had a flower stand in my front yard—sometimes selling flowers to the same people who had let me cut them from their yards that very morning. Later, during medical school in Boston, my wife and I often visited the Arnold Arboretum—it was one of our favorite places on a Sunday afternoon. Then, after I'd finished school, we came to California. That was in 1927.

"After seeing a little of Southern California I couldn't help but be disappointed —everything was so damn monotonous, so lacking in color. For a few brief weeks, of course, the native wild flowers would enliven the deserts and countryside, but except for an occasional spot of color from a jacaranda tree, a camellia, a rose bush or flowering fruit tree, the landscape offered little except green foliage."

For the next few years Ayres devoted himself to his practice and, as time permitted, pursued his own horticultural interests. Then, in 1939, came the Hawaiian Islands trip. More than thirty years later, Ayres recalls that trip and its return vividly:

"When we got back from Hawaii I looked around and said, 'My God, something ought to be done about this.' Our return to California only emphasized the monotony and lack of color in our own landscape. I'd drive for miles in this wonderful climate without seeing a single flowering tree or shrub in either a front yard, a park, or along the streets. It was an unfortunate situation. I didn't know how to correct it, but every time I thought of Hawaii and all that natural color, I felt it had to be corrected."

Sam Ayres thought about the problem for several years; the idea of a botanical garden or arboretum began to loom larger in his thoughts.

"I didn't know where, I didn't know how, but the idea took hold of me. Obviously, such a place couldn't be built around the same kinds of plants used in the Islands because of the differences in climate—they're tropical and we're Mediterranean. But by proper selection it seemed possible that we could reproduce all the color and beauty of the tropics by introducing and planting flowering trees, shrubs, and other colorful plants for non-tropical areas—areas with mild climates like Australia, South Africa, Mexico and parts of South America and Asia.

"The most likely way to bring about such a transformation in our landscape would be to establish an arboretum where new plants could be introduced, studied and planted so they could be seen and admired by the public. Then, with the creation of a demand for such plants, the arboretum could make them available to interested nurseries." And the nurseries, in turn, would make them available to that interested and that demanding public . . .

Ayres discussed the idea with friends and associates. One such friend was Dr. George P. Clements, who, in the 1920s, had been involved in the California Botanical Foundation and its short-lived botanical garden in the Mandeville Canyon area of the Santa Monica Mountains. "I received many good ideas from Clements —useful groundwork. I was greatly encouraged by some of the things I learned from him."

But the war came, other duties and preoccupations intervened, and not until 1945 was there a chance to seriously begin to work and plan toward that dream of an arboretum for Southern California. Ayres at this time was an active member of the Southern California Horticultural Institute, a dedicated organization of professional and amateur horticulturalists founded in 1935. Here, he felt, was the organization best qualified to undertake a venture of the scope and magnitude he envisioned.

"One night at one of the institute's meetings," Ayres recalls, "I rashly suggested to my friend Henry Davis, then president of the group, that a committee be formed to study the feasibility of establishing an arboretum. Henry said, 'Why don't you raise a motion?' "

Ayres did make such a motion. It was carried unanimously, at which point, according to Ayres, "Henry pointed a finger in my direction and said, 'All right, you'll be the chairman and will select your own committee.' "

And so, a committee was formed. With the formation of that committee the Los Angeles State and County Arboretum, although it had yet to find a name or a home, was born.

An Arboretum Committee of active, interested horticulturalists was selected. Under Ayres' leadership, this group began to investigate possible sites. "The first one we looked at," says Ayres, "was the Will Rogers ranch. Mrs. Rogers would have been willing to give us the property, and we probably would have taken it, but fortunately we had a soil expert from UCLA go out there and analyze the soil first. He discovered that the ground was hardpan. We would have had to blast holes in order to plant the trees, so we turned that one down." Shortly afterward, another ranch not far from the Rogers' property was considered, but before action could be taken it was sold. "We were about a week too late on that one."

Then began months of fruitless search: a parcel at the top of Western Avenue; another property in Whittier Heights; a piece of land near Hansen Dam; a section of the Huntington Estate in San Marino. All were evaluated carefully; all had to be declined or rejected for one reason or another—too hilly, too prone to flooding or fire, too expensive, or too complicated in terms of will or probate.

Meanwhile, Dr. Ayres and others were spreading the gospel of "Arboretum" to everyone they could. The minutes of the Southern California Horticultural Institute's joint meeting with the Arboretum Committee for the evening of June 8, 1944, give an idea of the values which Ayres and his apostolic committeemen were emphasizing: "Dr. Ayres was first called upon by acting President of the Institute Henry Davis to submit a report of his Committee's findings. Dr. Ayres stressed first the need for an arboretum from the standpoint of tourist attraction, cultural and economic advantages to the Southland, and the educational contributions it would provide. Second, due to the scarcity of available sites and the possibility of a resumption of subdivision of large areas immediately following the war, this Committee should at least at the present time investigate suitable sites and do all that is possible to secure or hold one until the war is over. He also stressed the possibility of making this project a War Memorial, and that many people would be interested in contributing to such a memorial either in funds or through planting projects and that such a venture could be a post-war rehabilitation project . . . " As if all this were not persuasive enough, Ayres also brought up the fact "that the possibility of obtaining funds is easier now due to provisions for deductions on income tax." Horticultural salesmanship, if ever there was!

But still no site, adequate in all respects, was found. Then came a chance series of events which would settle the matter of location. Ayres tells it this way: "In early 1947 some friends called us and asked us if they could show us a lot they had just purchased in Arcadia. They suggested a picnic lunch and thought we would like to see the tropical lagoon on Lucky Baldwin's old Santa Anita ranch. I'd never heard of Lucky Baldwin, but we thought it would be a nice outing so we accepted. We drove out there and when I saw it, I said to myself, 'This is it.' I knew exactly how Brigham Young must have felt when he first saw Salt Lake Valley.

"The buildings were all going to ruin. They hadn't had any protection for a long time and were a horrible mess. Up on Tallac Knoll there was a real estate tract office—street maps had already been drawn, stakes were placed, and they were about to put the lots in the knoll area up for sale. I told the tract manager, Wesley Davies, what I had in mind and he said he thought a few acres might be set aside for our project. I told him I wasn't talking about a few acres. I was talking about the whole thing!"

Ayres immediately contacted his friend John Anson Ford, Los Angeles County Supervisor, who agreed that the idea and the site were worth more study and more discussion. After the Arboretum Committee had visited the old ranch site, a meeting was arranged at the Mayflower Hotel. Invited was the Los Angeles County Board of Supervisors.

Ayres recalls that "Howard Miller drew up a prospectus and gave a brilliant presentation. He said this could become the Kew Gardens of the West. The Board

of Supervisors was impressed. We took them over to the grounds and they went for it immediately. They thought it was a marvelous idea, but they thought the project was too big for Los Angeles County to handle alone and they felt they ought to get the State in on it."

Meanwhile, Harry Chandler, publisher of the Los Angeles *Times* and owner of the proposed development, took the property off the market. In Ayres' estimation, this was "one of the finest things a man ever did. In fact, I don't think he's ever been given sufficient credit. If Chandler hadn't taken that land off the market, there would be no Arboretum today."

Months now passed in which special legislation was drawn up and the complex negotiations between the State, County, and Arboretum Committee were worked out. Largely due to the efforts of John Anson Ford, the County Board of Supervisors approved the project. Ford's efforts in this matter were critical, for without the financial support of the County — which led in turn to State support — the Arboretum would not have come into being. The action was typical of his career as a County supervisor. He was a leading reformer in the cause of good government in Los Angeles and, always, a man ready to lend his energies to projects he deemed in the public interest — the Arboretum, Descanso Gardens, the Hollywood Bowl, the County Commission on Human Rights, the County Museum, and many others. When final details had been arranged, it was agreed that the State and County would jointly purchase the land — 111 acres, the other 16 came later — and that the County would then lease it from the State for a period of fifty years with an option to renew for a second fifty years. Price of the tract was $320,000, well below what Chandler could have realized on the open market.

Through the late summer and fall of 1947, meanwhile, progress was being made in the creation of a body to sublease the property from the County and to administer the fledgling Arboretum. The Southern California Horticultural Institute appointed an Arboretum Organizational Committee to be headed by Samuel Ayres. Legal opinions were sought, and much discussion and many memorandums ensued. Finally, in October of 1947, it was decided by this Organizational Committee that a nonprofit foundation should be created as the most efficient means of administering and developing the Los Angeles County Arboretum, as it was then called. The County's legal counsel at this point came up with two optional methods by which the new foundation could legally administer the Arboretum: The first was under an organizational setup similar to that of the County Museum in which all employees would be under Civil Service and in which the County would furnish all funds necessary for capital improvements, operation and maintenance. The second method permitted the County to sublease the Arboretum to the new foundation. Under this plan, the County would provide funds for capital improvements, such as fences, roads and buildings; but the foundation would have to provide funds for personnel, maintenance and plant materials. If the foundation decided on the second plan and it later proved unsuccessful, the first plan could then be put into effect. The Arboretum Organizational Committee selected, with certain modifications, plan two, which would give the nonprofit foundation close control of Arboretum operations.

On February 20, 1948, the California Arboretum Foundation was incorporated as a nonprofit organization. The incorporators were Samuel Ayres, Jr., Manchester Boddy, Robert Casamajor, Ralph D. Cornell, Howard Miller, Mrs. William Warren Orcutt, William S. Rosecrans, Mrs. William D. Shearer, Frits W. Went, and Mrs. Richard Y. (Susanna Bryant) Dakin. That same month, a lease was signed with the County of Los Angeles under which the Foundation was to operate the Arboretum and the County would furnish capital improvements. The Foundation also was to raise funds for maintenance and operation. The County agreed to furnish yearly subventions, based on annual budget requirements, for the first few years in order to assist the California Arboretum Foundation in getting started.

The first meeting of the Board of Trustees of the California Arboretum Foundation, Inc., was held March 3, 1948, in the Los Angeles Chamber of Commerce building in down town Los Angeles. During the forty-five minute meeting, Frits W. Went was elected Foundation president, bylaws were adopted and other organizational and financial business was conducted. Among other matters, a request from the Arcadia Horse Owners Association asking for bridle path privileges through the Arboretum was tentatively denied; the Arcadia Fire Department was granted permission to use the Arboretum lagoon for training purposes for one year; and President Went was put in charge of a committee to select an organizing director for the Arboretum.

During the weeks and months that followed, programs were planned and plans were formulated: The search for a director was begun. A solution was found to the Arcadia Horse Owners' bridle path problem. The National Society of Colonial Dames was contacted and they expressed great interest in the restoration of the historic buildings on the grounds. An executive council was formed. Committees were also created to spearhead membership and fund raising; to study the historical background of the "adobe hut" (as the old Hugo Reid adobe ranch house was then called); to prepare a Foundation brochure; and to settle legal and other matters with the County. A fund-raising campaign was launched with the help of Harry Cartlidge, a previously successful money raiser, and a list of prominent, potential Foundation members and donors was compiled. A master plan for the grounds was started. Foundation stationery was printed.

On August 11, 1948, the Trustees voted to offer the position of director to Frans Verdoorn at an annual salary of $9,600. Verdoorn, editor and publisher of *Chronica Botanica* in Waltham, Massachusetts, accepted the job a few days later and agreed to start on October 1. In affirming his appointment, the Trustees agreed, among other things, that "Dr. Verdoorn and his staff should have as much academic freedom as is customary in the better scientific institutions"; that a "Publication Committee will be appointed to aid in determining publication policies for the Arboretum"; and that "an effort will be made to obtain adequate, temporary office space" on the grounds.

Temporary office space was found in a private residence on Old Ranch Road, near what is today the Arboretum's Youth Education Center. This area, on the west side, was to be the main Arboretum entrance until the completion of the Baldwin Avenue entrance some time later.

A secretary was employed and Verdoorn immediately began to correspond with scientific institutions all over the world. In fact, largely because of this correspondence, the Arboretum was well known overseas even before it gained recognition at home. Verdoorn also laid the groundwork for the Arboretum's library by acquiring the first thousand volumes. Much of Verdoorn's correspondence was in the nature of requests for botanical and horticultural journals, pamphlets and periodicals, as well as seed exchanges with other arboretums and botanical gardens throughout the world.

When the Foundation assumed management of the Arboretum, there were two caretakers on the grounds, both of whom had been employed by the previous owners of the ranch: Dewey Nelson, who was primarily responsible for the security of the grounds, and his part-time assistant, E. J. (Jack) Fawcett, a nephew of the almost legendary E. J. "Lucky" Baldwin. Nelson lived in a trailer located in what is now the Historical Area, and thus was on the job literally twenty-four hours a day. He also owned a very large and formidable black dog named Wolfer. Wolfer was of considerable assistance, especially on those nights when gangs of teenagers and young adults would congregate in the old buildings in the northeast section of the grounds. Except for infrequent visits, these trespassing activities stopped when chain-link fencing, slightly over two miles of it, was erected around the property in late 1948.

In December of 1948, a committee was appointed to assist the director in the selection of a horticulturist. George Spalding, who was with Eastgate Select Nursery and who had gained a comprehensive horticultural background by way of the Stockbridge School of Agriculture and the New York Botanic Garden, was chosen for the position which he assumed in January, 1949. After a few days' orientation to familiarize himself with the sprawling, overgrown grounds, Spalding undertook the Herculean task of pruning an ancient Belle of Portugal rose which completely covered an arbor on the south side of an old wooden wing of the Hugo Reid Adobe. The rose had gone untended for many years and proved to be a major job, requiring a full week to complete. This job typified many such tasks that remained to be done if a neglected, nineteenth-century ranch was to be transformed into a modern, twentieth-century Arboretum.

By January, 1949, the Arboretum staff consisted of the director, his secretary, the horticulturalist and the two caretakers. Work was underway on a master plan, and a soil survey was being made to provide an accurate soil map and written record of the grounds as they were in the beginning. A student at Pomona College, moreover, was said to be working on an herbarium collection of plants already existing on the grounds, but this turned out to be a collection of weeds only, and it was some time later before an inventory of woody species could be made. The herbarium sheets made from this weed collection are today in the Arboretum's herbarium.

Frans Verdoorn submitted his resignation as director in March, 1949, to return to his former publishing activities in New England. The resignation was accepted "with sincere appreciation for the fine services rendered to the Arboretum."

William Hertrich, a trustee of the Arboretum Foundation and curator of the

Huntington Botanical Gardens in San Marino, assumed nominal supervision of the Arboretum at the trustees' request. It became the duty of George Spalding, with the title of Acting Superintendent, to oversee daily operations and serve as secretary to the Board of Trustees, a position he held for twenty-one years.

"Temporary" prefabricated buildings were moved to the grounds adjacent to the Old Ranch Road gate during the summer of 1949, and occupied by the staff in August of that year. One building served as the administrative office and the other as a caretaker's residence. These "temporary" structures, after more than twenty years, are still in use. The former administrative building now houses an office for the Youth Education section, classrooms and a workroom. The other is a nature museum designed primarily for children.

Early in 1949, a small greenhouse was constructed to be used for plant propagation, so that the plant testing program could get underway. This greenhouse, still located in the South African section, was completed in August, 1949, and has remained in continuous operation ever since. When the main propagating work was moved to the present greenhouse range in 1954, this building became a research greenhouse for special projects.

Shortly after the property was purchased, Dr. Samuel Ayres provided funds to hire an architect to develop a master plan for the grounds. George Kern, A.S.L.A., was selected and produced a plan with the main entrance to the Arboretum on the north at Colorado Boulevard. The design was formal, following a traditional European concept used in many early botanical gardens. After considerable discussion and debate, the Foundation board agreed that because of the unique nature of the Arboretum site and the many opportunities it presented, a master plan should incorporate more up-to-date ideas. The plan, therefore, was not accepted.

Harry Sims Bent, an architect who was already working on a county project at Hancock Park, was then asked to develop a second master plan for the grounds. Bent had a reputation as an independent, creative thinker and operator who did things much as *he* thought they should be done. It is doubtful whether he would have followed detailed instructions if they had been given. His only direction seems to have come through informal talks with various members of the Board of Trustees. A copy of Frans Verdoorn's lecture, "A Modern Arboretum," was also prominent on his desk. Bent's final master plan was approved by the Board of Trustees in May, 1950, and sent on to the State and County for their approval. That he did a worthy job is obvious. His broad outline has been followed over the years with only minor changes.

Bent's plan determined the general circulation of roads, the areas to be set aside for administrative buildings, the location of service areas and the main entrance. It was apparent that the Old Ranch Road entrance on the west side could not remain as the Arboretum entrance because of the residential nature of the area and the complete lack of parking space. Bent's master plan indicated a main entrance to be located on the proposed extension of Baldwin Avenue (which would connect Huntington Drive on the south with Colorado Boulevard on the north). It also meant that a piece of land between the projected Baldwin Avenue and the existing Arboretum boundary would have to be acquired for the entrance. The Board of Trustees approached the Los Angeles Turf Club, owners of the parcels needed, and they were finally purchased by the County.

Los Angeles County Supervisor John Anson Ford. 1954.

Samuel Ayres, Jr., M.D. in 1

LOS ANGELES STATE
and COUNTY ARBORETUM
Now being developed
by
The California Arboretum Foundation
Open every day of the year from 8 until
The bell will ring a few minutes before closing time
The park will be closed occasionally owing to
construction and landscaping work
Cars should be parked outside of gate or at the
temporary inside parking area
Bicycles must be placed in rack
No picnicking
Dogs must be kept on leash
No children under fourteen admitted unless
accompanied by adults
Photographing painting and sketching conducting
of classes or groups allowed only with a permit to
be obtained at the temporary administration building
For free guide registration permits and all other
information apply at temporary administration building
at 301 North Old Ranch Road
(house at right outside of the gate left wing
entrance at back)
Administrative office and horticultural reading room
Open every day of the year from 9 A.M. until
No parking in front of gate

The first Arboretum staff (1948). From the left: Jack Fawcett, assistant to Dewey Nelson (with Mrs. Nelson) who doubled as curator and guide; Frans Verdoorn, director, and his secretary Nell Ferncase; George Spalding, horticulturist.

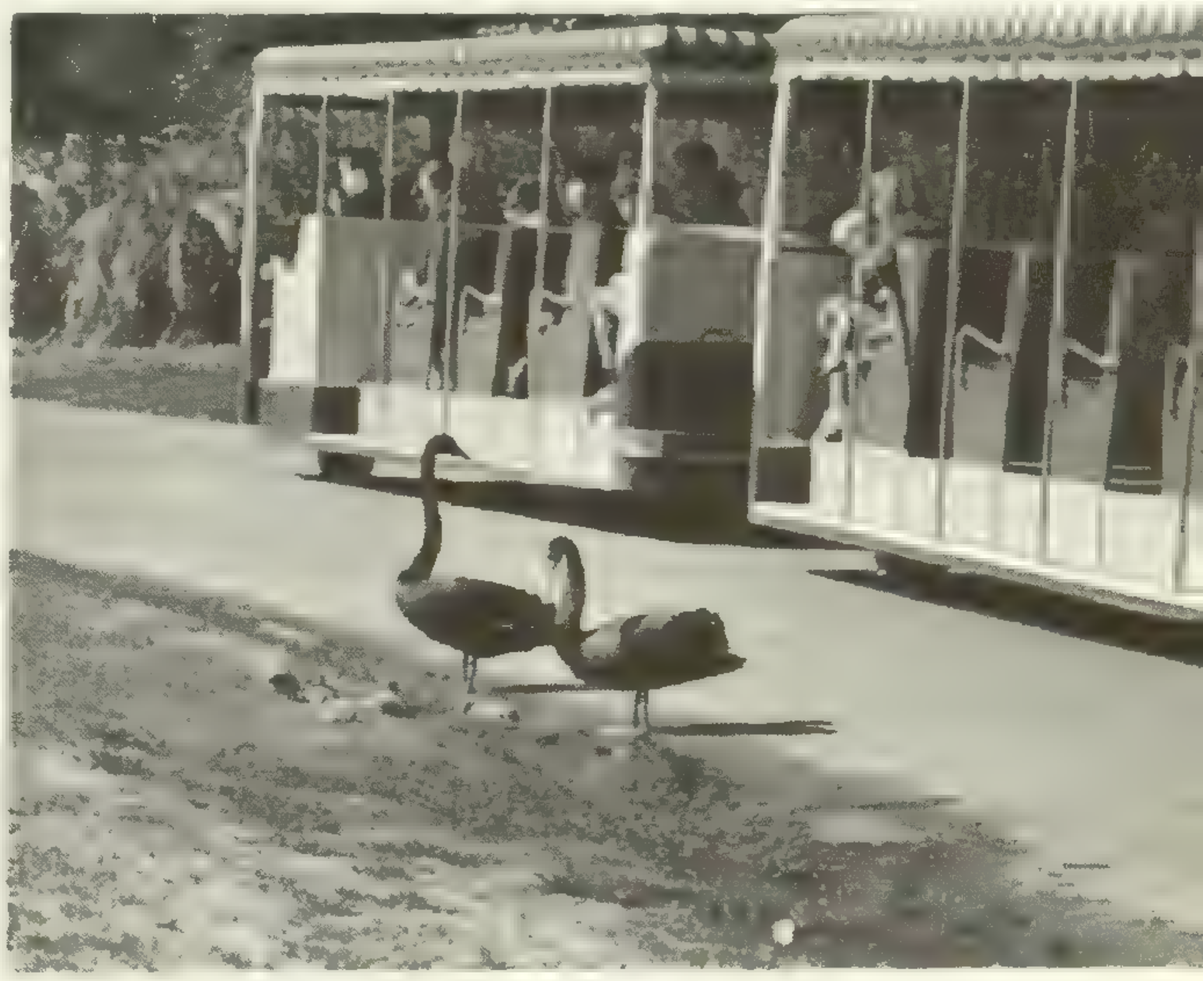
A view across Lasca Lagoon when the Hugo Reid Adobe was a tile-roofed, "modern" structure serving as the home of E. J. Baldwin together with the wood building on the right which Baldwin built in 1879. This annex, as it was called, was razed when reconstruction of the Adobe began.

The restoration of the Hugo Reid Adobe to its original form was a major rebuilding job involving the making of 5,000 adobe bricks for the walls and a new roof made of rawhide, canes, mud, and tar. This photo was taken before the application of the bricks.

A view of the Hugo Reid Adobe as it looks today.

A view of E. J. "Lucky" Baldwin's Coach Barn during a short period in pre-Arboretum days when it looked like the proverbial haunted house.

This photo was taken in 1947 when purchase of the land from publisher Harry Chandler was under negotiation. In the foreground from left to right are Dr. Samuel Ayres, Jr., Robert Casamajor, Supervisor Raymond Darby, and Wesley Davies, a Chandler representative. Growing out over the lagoon is a much admired date palm that was blown over and lost in a wind storm in January of 1969.



Early visitors to the Arboretum rode in a jeep-drawn tram. Starting in 1966, they rode in a modern minibus, quiet enough not to frighten away the Tasmanian black swans and their cygnets.

Now the headquarters of the Youth Education section, this prefab building served as the administrative office for the first eight years.

A view (left) of the Santa Anita Depot in 1900 when it was a commuter stop, and (right) in 1940 just before it was closed.

The Santa Anita Depot as it is today, reconstructed on the grounds of the Arboretum.

Lasca Leaves

An aerial view of the Arboretum taken in 1962 with the San Gabriel Mountains as a backdrop. Baldwin Avenue separates the Arboretum from Santa Anita Racetrack on the east; a flood control channel (right center) running up to Colorado Boulevard forms a western and then a northern boundary; in the center is the figure-eight road enclosing Lasca Lagoon, historic buildings, and (to the left) the west acres.

The Arboretum is for people —

A Saturday morning youth education class studies insect-plant relationships.

Students on a school field trip look for mosquito fish in the Aquatic Garden atop Tallac Knoll.

Following the "formal" discussion at a Sunday afternoon lecture on vegetable gardening, visitors move to the display garden itself for a question and answer period.

Lasca Leaves

On December 26, 1969, a fire swept by 70-mile-per-hour-winds cut through the center of the Arboretum producing scenes like these in the vicinity of the Queen Anne Cottage which, fortunately, escaped with only blistered paint. The trunks of Washingtonia robusta *palms in the area still show scars from the fire.*

A search for a new director had been initiated at the time of Frans Verdoorn's departure in the spring of 1949. After months of interviewing candidates and reviewing qualifications, Russell J. Seibert was appointed to the post. Seibert had been employed by the U.S. Department of Agriculture, working in Turrialba, Guatemala. He had acquired extensive experience in Central America, South America and Haiti, where he participated in the Department of Agriculture's rubber investigations and other plant activities. He assumed his job as director on June 1, 1950, bringing with him a lovely and capable wife who was no stranger to arboretums. Mrs. Seibert was the daughter of George Pring, for fifty years superintendent of Missouri Botanic Gardens.

With the arrival of Seibert, the first phase of grounds development got underway in 1950. This included the removal of trees in the planned road areas, the grading of the circle road around the lagoon, creation of a connecting road to the Old Ranch Road gate, and the grading of loop roads in the West Acres area. When these broad and gently curving avenues are viewed today, it is difficult to realize the tremendous amount of work required to build them. It was necessary to remove more than a thousand trees—mainly *Eucalyptus globulus* and *Washingtonia robusta,* these two species being the largest group of existing trees on the grounds. The removal of a considerable number would have been necessary under any circumstances to allow for the diversity of an outstanding arboretum. As it was, the eucalypts, in particular, proved to be in such deteriorated condition that they constituted a hazard to public and staff. During the initial removal work, Seibert and Spalding checked fifty-two eucalyptus trees on a random basis as they were cut down. Of that group only one had a solid root system.

The palms proved especially difficult to remove. On one occasion a ¾-inch steel cable was fastened to a palm trunk about eight feet above the ground. The other end was attached to a D-8 Caterpillar tractor. When power was applied the cable snapped like string. Such palms may look slender, but this experience showed how appropriate is their specific name *robusta.* Additional trees have been removed since, and more will undoubtedly have to be removed in the future as the grounds are more fully developed.

Another major project involved changing the outlet of the lagoon and filling the area east of the adobe. The lagoon's spillway was an old cement ditch which ran immediately east of the adobe and then in the direction of the Santa Anita race track. This ditch, like all of the area immediately to the east, was well below the level of the lagoon. First, the area had to be cleared of growth, including many eucalyptus trees. When clearing and removal were completed, filling began. Fill dirt was obtained by lowering the grade in the West Acres section some three to four feet, dredging out the upper lagoon and a third of the main lagoon, and using the dredgings for fill. As a result, the entire area between the present eastern edge of the lagoon and Baldwin Avenue is composed of 12 to 15 feet of fill, and the outlet of the lagoon is at the north end, rather than south end, of the eastern bank where it empties into a storm drain.

About this time the new position of superintendent was authorized by the Board of Trustees and the director recommended George Spalding who, on July 1,

1950, assumed the job. The positions of plant recorder and propagator were also authorized. The plant recorder's first chore was to list all the woody plants existing on the site since 1948 in order to augment the list of herbaceous material which had already been compiled.

The system set up for new plant accessions was patterned after the one in use at the New York Botanical Garden. It was selected because of its simplicity and because it did not require large numbers of digits which a cumulative system demanded. After more than twenty years, this system continues to fully satisfy all the Arboretum's requirements. The accession information also appears on all plant labels in abbreviated form and provides an instant, in-the-field record of plant name, family, and native country, as well as when and in what form it was acquired.

With the arrival of the plant propagator in October, 1950, the seed planting program got underway. Correspondence with other botanical gardens and arboreta throughout the areas of the world with climates similar to Southern California had been going on for well over a year and seeds were beginning to arrive. Australian seeds, particularly acacias and eucalypts, were grown as rapidly as possible in the limited greenhouse space available. Some of these seeds grew rapidly enough to permit the first plantings of these groups in the ground in the spring of 1951.

In 1950, an official weather station was established on the grounds in order to record temperature, rainfall, evaporation rate and other needed meteorological information. And in the same year *Lasca Leaves,* the quarterly journal of the Arboretum, was also established—but more on this later.

By the early 1950s, the thrills, excitements and uncertainties of founding an Arboretum had given way to a feeling that progress, steady and sure, was taking place. Staff responsibilities and routines had been established. A planting program was underway. Building was taking place. The Arboretum's historical buildings were undergoing the initial phase of restoration. The geographical plant divisions were beginning to take shape. More and more people — in the local area and throughout the globe — were learning of the Arboretum's existence.

A major administrative change took place in 1953. On July 1, the California Arboretum Foundation relinquished direct management of the Arboretum, concurrent with the establishment of the Department of Arboreta and Botanic Gardens by the Los Angeles County Board of Supervisors. There had been some discussion of putting the operation under the County's park department, but the persuasive argument that an arboretum is a scientific and educational institution, and not a park, convinced the Board of Supervisors that a new department would serve the best interests of the community.

Under this arrangement the Arboretum would continue to operate under the original eight objectives established by the foundation. These objectives called for the Arboretum to be:

1) A horticultural center for Southern California, providing facilities for the promotion of horticulture and floriculture, fostering more extensive and intelligent use of ornamental plants and trees to enhance the beauty of Southern California's gardens, parks, and parkways.
2) A center for the introduction, testing and improvement of plants adaptable to Southern California.

3) A gardening school for training men to be gardeners, garden superintendents, propagators, and other skilled personnel required by wholesale and retail nurseries, and private gardens; with a portion of this curriculum of interest to amateurs.
4) A center of research and scientific study, working in collaboration with educational institutions and with federal, state and county departments of agriculture. An information center, maintaining a catalogue of plants cultivated in Southern California. Here, speciments can be readily identified and practical advice given on planting, propagation, and cultivation.
5) A horticultural library and herbarium.
6) A publication center for bulletins, books and pamphlets of horticultural, botanical, and historical interest.
7) A preserve of early California buildings and authentic historical gardens.
8) A bird sanctuary.

At the time of the creation of the new department, the Board of Supervisors also created a Board of Governors to act in an advisory capacity to the director. The board consisted of fifteen members (subsequently enlarged to twenty-five members) appointed by the county supervisors. All of the members of the Board of Trustees of the California Arboretum Foundation were appointed to this new board when it was established, retaining their membership on the Trustees. Today, however, each board is a separate entity. Once a year there is a joint meeting of these boards at which time a full report of Foundation and Arboretum activities for the year is presented and the various members have a chance to exchange ideas.

An important grounds addition was made in 1953 when the final 3.5 acres of land needed to round out the boundaries of the Arboretum as they are at the present time were acquired. The first greenhouse in the new propagating area in the northeast corner of the grounds was completed this same year and construction was underway on the attached headhouse to include office space, a potting room, and rest rooms. The first wing of the service unit was also under construction. Grading for the main entrance was also started, based on Harry Bent's original plan.

The grounds were not yet open to the public on a regular basis because of the dangers posed by the major construction projects. However, guided tours were given by appointment, and during this period 207 tours were conducted, making it possible for 5,444 persons to see what progress was being made on the grounds. These tours were under the guidance of Dewey Nelson and H. H. Benson and were primarily devoted to the historical area and included a brief mention of future plans. Together, these two men had also developed "The Arboretum Story," an informative slide and narration program designed for civic groups and other organizations. This was presented more than fifty times during 1953 alone. The program acquainted the public with the Arboretum as it was, and as it would be, providing an increasing number of services for the community in future years.

Photograph and slide files were started in 1954, and a newspaper clipping service produced 253 separate items from various newspapers in which the Arboretum was mentioned or featured. Slowly but surely fame was coming!

Several important plantings took place in 1953-54, although their importance was not immediately apparent. The first was the planting of lampranthus along both sides of Baldwin Avenue, from Colorado Boulevard south to the Arboretum's

main entrance, which two years later had become a blaze of color and a real traffic stopper. A second was the hedge of *Bambusa oldhamii* along Baldwin Avenue from the south parking lot to the end of the fence, then westward to Old Ranch Road, a distance of about 900 feet. It required a much longer time for this to mature, but within five years it had formed a solid wall, very effectively screening the race track from the Adobe area. The bamboo also served to hide a rather steep and uninteresting grade left when the roadway was constructed east of the lagoon. Still another achievement was the first successful grafting of a white jacaranda. A dozen scions, about one-half inch in diameter, were obtained from the Botanic Garden in Lima, Peru, through a contact established by Russell Seibert. All twelve were put in as cuttings and all but three quickly died. The survivors did not produce roots, so in an effort to save them they were grafted onto seedling root stock. Two of the grafts died leaving one lone survivor. But one was enough. It grew and prospered, and all of the white jacaranda trees in Southern California today are clones of this tree.

In 1955, a second propagating greenhouse and the service building were completed. Public rest rooms were also completed, enabling the Arboretum to be opened on a regular basis. The formal opening took place at 2 p.m. January 8, 1955. Tram tours of the grounds—no appointment necessary—became available on Sundays. Weekdays tours of the grounds were still by appointment. Weekday tours, composed mostly of student groups from grade school to college, were enjoyed by a total of 7,180 people in 1954-5.

The Sunday tours covered nearly all of the Arboretum. The passenger tram, pulled by a jeep, went from the loading area to the Coach Barn. Here the passengers disembarked and were escorted by a guide through the barn, across the mall to the Queen Anne Cottage, then around the edge of the lagoon to the Hugo Reid Adobe where they again boarded the tram for the balance of the tour.

The Herb Garden, today one of the Arboretum's most intriguing and popular areas, began to take shape in 1955. Basic grading was completed in April of that year and the general pattern had begun to emerge by the end of June. The Southern California Unit of the Herb Society of America deserves credit for initiating the project and for working closely with the Arboretum staff to make the garden the outstanding place it is today.

In the spring of 1955, Russell J. Seibert resigned his post to become the director of Longwood Gardens in Kennett Square, Pennsylvania. The Arboretum staff held a going-away party for the Seiberts in the historical area, and an editorial in *Lasca Leaves* praised the forty-year-old director for his "often inspired guidance and direction" over the years, and expressing a "deeply heartfelt regret at his leaving us."

In the interim following the departure of Seibert, George Spalding was requested to serve as acting director, pending the arrival of William S. Stewart, who began his fourteen-year tenure as director on September 6, 1955.

Stewart, also forty and a native Californian, was chairman of the Citrus Experimental Station's Department of Horticulture. In accepting the position Stewart stated that while continuing the program of developing new ornamental plants for Southern California, he planned "to accelerate a research program for the backyard gardener."

In his first report to the Board of Trustees, Stewart mentioned that he had been

contacted concerning the possibility of establishing a garden for the blind and a medicinal garden at the Arboretum. A committee appointed to study the matter recommended that a fragrance garden be developed adjacent to the Herb Garden.

On December 14, 1956, the new administration building and gatehouse were dedicated. The occasion may have been the first in which a *plant* performed a ribbon-cutting ceremony. The plant, *Mimosa pudica,* is sensitive to any disturbance of its foliage; at the slightest touch the leaves droop. The mimosa was wired with a contact on one of its leaves connected to a power source. This was placed above another contact which led to a wire with a very low melting point, which in turn was connected to the ribbon. When the mimosa leaf was touched, it drooped, making contact and sending a low current through the wire, causing it to melt. The ribbon fell. The dedication was completed.

The new buildings were made of concrete block in a modern design which contrasted dramatically with the old Rancho Santa Anita buildings in the historical area. The design of these new buildings was such that the Concrete Masonry Association selected them as the best example of cement block structure in Southern California in 1956.

Following the dedication ceremony, the Children's Theater group, directed by Mrs. William Stewart and sponsored by the Historical Committee, presented a Christmas Posada, the traditional Mexican Christmas pageant in which everyone, especially the children, participate. The Hugo Reid Adobe was the setting and guests included Arboretum neighbors, friends and Foundation members. For a number of years the pageant became an annual event, each presentation varying from the previous year. One of the most memorable was the year in which the posada started at the Queen Anne Cottage and the *nacimiento* was floated across the lagoon, the candles flickering in the darkness, to the Adobe.

The completion of the new buildings made it possible to be open to the public seven days a week. Attendance increased accordingly; the first six months of 1957 equalled the entire year of 1956. Sunday, however, was still the only day tram tours were available without appointment.

This was also the year the flood control channel, traversing the grounds from Colorado Boulevard to Baldwin Avenue at a point opposite the outlet of the lagoon, was finally finished. The long construction period caused considerable disruption in maintenance and normal visitor programs. Grounds traffic had to be rerouted several times. The channel had been originally designed by the U.S. Army Corps of Engineers as an open ditch throughout its entire length. Realizing that this would be an eyesore in an otherwise lovely area, the Foundation Board was successful in urging that the channel be covered where it cut across the main portion of the grounds.

There were more changes and improvements the next several years. The administration building wing was completed in 1959. Built on two levels, the upper floor provides space for the library, herbarium, five offices, a workroom for the library and a conference room. The lower level can be used as a lecture hall or divided by movable partitions into four classrooms. The lower level is also used a great deal as a display area during flower shows. The Arboretum's library was originally housed in the first temporary building, located near Old Ranch Road. It was later moved into the business office area of the new administration building. Upon completion

of the new wing, the growing collection of books and publications was installed in its permanent location.

The early 1960s brought more activity and development. To accommodate a growing public, the tram loading area was constructed, adding a needed waiting facility for the public and providing Arboretum tour guides with a much more efficient means of handling capacity crowds. The construction of the "Bromeliad Tree" in the ramp area added a colorful and interesting feature near the main entrance. It was at this time that the South American Plant section was gradually moved from its initial location near the Old Ranch Road gate to the south slope of Tallac Knoll, a much more frost-free area.

In 1962-63, Arboretum Director William Stewart and Mildred Mathias, professor of botany at UCLA, presented a series of 26 weekly programs over a Los Angeles television channel. Entitled "The Wonderful World of Plants," the thirty-minute programs covered a wide variety of subjects in the horticultural and botanical fields.

During the 1960s the Arboretum became a center for educational and horticultural activities of many kinds. Adult and junior courses in horticulture, botany and related fields were presented on a regular basis at the three major facilities of the Department — Descanso Gardens, South Coast Botanic Garden and the Arboretum — with the largest number being offered at the Arboretum. Increasing numbers of plant societies and garden clubs were holding their meetings and flower shows at the Arboretum, the flower shows attracting capacity crowds from all over Southern California.

With its lake, its many trees and its protected grounds, the Arboretum is a natural haven for birdlife and, therefore, a natural meeting place for birdwatchers. Over the years, nearly 200 species have been tallied, including common Southern California backyard birds, migratory visitors from far-away places, and the exotic peafowl which call the Arboretum home. The late W. Dan Quattlebaum compiled and published the first list of Arboretum birds in the early 1950s. His conducted bird walks and "Bird Notes" column in *Lasca Leaves* were popular features with local birdwatchers for many years.

No avian species is more familiar to the Arboretum visitor than the peafowl *(Pavo cristatus)* which roam freely through the grounds. Three pair were imported from Asia by "Lucky" Baldwin around 1890 as a colorful adornment to his rancho. Those six birds thrived and multiplied, and today their descendants are a big attraction, especially in the spring when they display their magnificent train feathers in wooing the peahens. (If the wooing goes well, summer will bring numerous peachicks which can be seen following their mothers about the grounds.)

A census taken in the spring of 1960 showed the number of peafowl to be considerably more than necessary, so 160 of the birds were sold at auction. An unexpected by-product of this fund-raising effort was the resultant publicity. A picture story appeared in *Life* magazine, followed by television, radio and newspaper coverage. Today the peacock is synonymous with the Arboretum, and it has been adopted as a symbol of the city of Arcadia. Whether we like them or not (and some don't, particularly staff and neighbors who have listened to their raucous cries day after day, night after night), the peacocks and peahens are with us and will undoubtedly stay.

The spring of 1967 saw completion and dedication of the Foundation's long-

awaited Peacock Pavilion, a place where visitors can obtain light refreshment while enjoying a view of the grounds and neighboring mountains. The lower level contains a gift shop and the Foundation business office.

Early in 1969, William S. Stewart informed the Board of Governors that he was relinquishing his post as director to accept the position of scientific director of the Pacific Tropical Botanical Garden which was being developed on the island of Kauai, Hawaii. Prior to their departure in December he and Mrs. Stewart were given a warm send-off at a staff luncheon and at an honorary dinner given by the Board of Governors and the Board of Trustees of the Foundation. Pending selection of a new director, Glenn Hiatt, assistant director, took full charge of Arboretum activities.

Francis Ching, who had joined the Arboretum in 1956 after earning degrees in ornamental horticulture and who had served in many capacities, including research assistant, chief horticulturalist and superintendent, was appointed director of the Department of Arboreta and Botanic Gardens on May 5, 1970.

Under Ching's direction, the Arboretum has continued to serve the public and the community, often in innovative and expanded ways. The new director's philosophy was probably best summed up in excerpts from an address he gave before an arboretum conference in Seattle in early 1972: "As a public arboretum, it is our policy in Los Angeles to become more intimately involved with the affairs of the community . . . An arboretum is different things to different people. We cannot take a purist or traditional attitude and justify our goals . . . We must serve the needs and functions of the community we live in. Most of all, the Arboretum must be viable."

New garden features and educational programs at the Arboretum reflect this sense of community involvement. Among these can be included the new Juniper Display Garden. As any observer of the urban or suburban landscape knows, junipers are a favorite plant in Southern California. Still, there has been no single place where homeowners could see, compare and decide between the great number of common and uncommon mature species and varieties available. The present juniper display at the Arboretum, aside from being a lovely planting area, fills this need.

A very recent development, the Aquatic Garden atop Tallac Knoll, has become a focal point for visitors of varying interests — photographers, fanciers of aquatic plants, landscapers, students of ecosystems and those who simply find esthetic pleasure in a serene brook or poolside setting amidst a forest of venerable Engelmann oaks. This man-made garden with its terraced pools and recirculating water system looks totally natural, and is indeed a totally self-contained ecosystem—a rich, though small example of an aquatic environment. The new developments in the Meadowbrook area, with a 1000-foot stream bed linking up with the Aquatic Garden, will allow for six more acres of Asiatic and North American plant collections as well as providing for specialty gardens of perennials and other garden favorites. These are the main accomplishments so far by the landscape firm of Lang and Wood that was engaged in 1971 as consultant landscape architects to the Department.

The new Garden for All Seasons reflects the recent surge of interest in home-grown vegetables. Here, the "home farmer" can see vegetables and flowers being grown at any time of the year; at the same time he can learn the proper cultivation techniques.

A new entranceway complex is being developed that will expose visitors to a greater number of horticultural displays and exhibits as they enter the Arboretum, notably the Demonstration Home Gardens, ground-cover and turfgrass displays, and the juniper, orchid, shade-and container-plant areas. A major feature of this new complex is a new gatehouse, already under construction, that will house the entranceway Information Center. Continuing development in the main entranceway area will mean a greater emphasis on the use of trees and shrubs to blend with, and soften the architectural features already present. A greater number of large flowering trees are planned for Baldwin Avenue to further accentuate the Arboretum and to soften and obscure the asphalt thoroughfare and parking lots. Because of the ever-increasing use of the Arboretum for flower shows and meetings by garden groups and horticultural organizations, and because of the increasing popularity of public services in the form of youth and adult education, public lectures and displays, a combination exhibition hall, classroom and workshop facility is high on the priority list. Such a facility would serve greater numbers of people — and there is every indication that the Arboretum can expect those greater numbers in the coming years and decades. Attendance for 1972 increased by 17.2 percent over 1971, the greatest yearly increase at the Arboretum since its inception, a good indication that the public is responding favorably to the Arboretum's new directions.

The California Arboretum Foundation continues to play a large and vital role in making available needed funds for new programs and in supporting the development and expansion of new programs and projects. During the County's financial crisis of 1971, the Foundation frequently came to the rescue, providing needed funds at a time when all departmental budgets were frozen. Some Foundation-sponsored events do more than raise money; they acquaint new segments of the public with the Arboretum and its work; and they expose interested members of the community to the joys and satisfactions of becoming Foundation members and Arboretum volunteers. Colorful fund-raising events like the two "Baldwin Bonanzas," in May, 1970, and in April, 1972, and the "Queen Anne Frolic" held in September, 1971 contribute greatly to the total good of the Arboretum. More are planned for the future.

As we survey the past quarter century, and look ahead to the future, we can say with confidence that the dream of Samuel Ayres and others who worked so hard and selflessly for the Los Angeles State and County Arboretum, has become a reality.

Chorisia speciosa, *or Floss Silk Tree, used in the entranceway parking area. The Arboretum has helped to make this native of Brazil popular in Southern California, notably in the city of Whittier where its lovely lavender-colored flowers adorn many streets from October through December.*

Cassia excelsa (carnaval), *introduced to the nursery trade in 1964 by the Arboretum, owes its initial introduction to Southern California to Dr. Samuel Ayres, Jr., who gave the Arboretum seeds from his own specimen tree. The tree in this photograph stands at the entrance of the gift shop in the Peacock Pavilion.*

Fast becoming the most widely-used ground cover in Southern California is Osteospermum fruticosum, *the South Africa Trailing Daisy introduced to Southern California by the Arboretum in 1958. The planting here spreads out along side the administration building.*

The yellow flowers of the Tabebuia chrysotricha, *or Golden Trumpet Tree, are in striking contrast with the orange-hued aloes in the South African section. The Arboretum introduced this 20-to- 30-foot native of Brazil to Southern California in 1964.*

This early scene of Tallac Knoll gives a feeling of California as it used to be. The area contains one of the last virgin stands of Quercus engelmannii, *commonly known as Engelmann oak.*

A recent view of "Lucky" Baldwin's cedar-and-redwood-paneled Coach Barn from the Herb Garden, framed by a California pepper tree and flowering plum trees.

The variety in design and color offered by plants in containers is illustrated in this section of the Sunset Demonstration Home Gardens.

II

LUCKY'S DOMAIN

History and Horticulture Side by Side

TO tell the story of the Arboretum in terms of flowers and trees is to tell only part of the story. The Arboretum is more than a botanical and horticultural institution. It is also a museum of history — an outdoor museum consisting of landmarks from several major eras in the history of California. First, there is the Hugo Reid Adobe, a small ranchhouse originally built in the 1840s and typifying the "hide and tallow era" when California was still a part of Mexico. Then there are the Queen Anne Cottage and the Coach Barn, dating from 1881 and 1879, respectively, and symbolizing California's "gilded age," that opulent period following the discovery of gold in the West. In addition, there are examples of Indian habitation on the grounds to give the visitor some idea of the aboriginal life-style in Southern California. Finally, there is a railroad station — an authentic depot dating from the last decade of the nineteenth century. Around all this is the modern Arboretum of today.

One of the prime movers in the development of the Arboretum's historical area was Mrs. Richard Y. (Susanna Bryant) Dakin, a recognized historian (author of *A Scotch Paisano: Hugo Reid's Life in California, 1832-1852*) and one of the original incorporators of the California Arboretum Foundation. Mrs. Dakin successfully urged establishment of a committee to plan, raise funds and oversee the restoration of the historic buildings present on the grounds. She began working toward this goal in 1948, developing an outstanding list of members for the Historical Committee — an all-star roster of historians, planners, designers and interested citizens — each selected for his or her special knowledge and willingness to assist in the project. A resolution was adopted at a 1948 Board of Trustees meeting giving the historical Committee authority for the planning, development, maintenance, and use of the historical premises, subject to general review by the Board.

The first committee meeting took place on March 19, 1949, with Mrs. Dakin presiding. The late Western historian, W. W. Robinson, was elected secretary, a job which in his own words, he accepted "with obvious reluctance." Reluctant or not, Robinson remained in that post until 1960, and the minutes he kept are a faithful and often entertaining record of the considerable accomplishments made by the committee over the years. Robinson's eye for detail is evident in an excerpt from the minutes of that first meeting:

"Members convened on the porch of the Hugo Reid Adobe. From their chairs they listened to Chairman Susanna Bryant Dakin explain who was who and why

and watched rain spattering the dark waters of the lake, ducks racing across the surface, a background of aquatic plants, palms, eucalyptus trees, and distant, somber mountains . . .

"The Chairman promised that a mysterious *Mrs. X,* former nurse to Lucky Baldwin, would be available for consultation, as would member "E. J." Fawcett who is Baldwin's nephew . . . Full cooperation, too, is being given by MGM which plans to do a picture on Baldwin's life with Clark Gable playing the leading role . . .

"Dr. Robert G. Cleland's motion that the lake be stocked with fish for the exclusive use of the Committee was lost for want of a second — whereupon the Committee adjourned for sherry and fruit cake . . ."

A master plan for restoration of the historical section was completed and approved by the Historical Committee and the Foundation Board early in 1951. Harry Sims did the master plan and Charles Gibbs Adams prepared the landscape plan, based on historically accurate plantings.

Under the leadership of Mrs. Dakin, the Historical Committee launched an extensive program of planning and fund-raising which resulted in the complete restoration and refurnishing of the Queen Anne Cottage in three years. Maurice Block, formerly with the Huntington Library and Art Gallery, was in charge of the project. More than $60,000 was raised, and spent, by the Historical Committee to restore and refurnish this ornate "cottage" — some $15,000 more than "Lucky" Baldwin had spent in the original construction. During Baldwin's lifetime the cottage and its lakeside setting had formed one of the showplaces of Southern California. Historian H. H. Bancroft, visiting Baldwin in 1891, reported: "The scene is one of fairy-like loveliness; not only the little *bijou* residence and its surroundings, but the entire estate, with its groves and vineyards, its golden fruit and waving harvests, its shaded drives and vistas of mountain peak and valley, carrying the beholder into an ideal region, calm and peaceful as the fabled realm of Rasselas, where soft vernal airs, induce forgetfulness of the din and turmoil, the crowded streets and selfish intensity of city life."

The Queen Anne Cottage had been vacant since Baldwin's death in 1909 and was in very poor state of repair, but the upper walls and ceilings of the rooms at least retained enough of the original paint to make an accurate interior restoration possible. An elderly German carpenter who had worked on the building seventy years before was able to recall many details with remarkable accuracy. He also recalled one of "Lucky" Baldwin's more alluring feminine visitors (of whom it is said, there were many), the beautiful actress Lily Langtry.

At the time of Baldwin's death the doors, stained glass windows, floor tiles in the entrance hall, and marble facings for the fireplaces had been removed by the family and crated for storage in the nearby Coach Barn. When the State and County purchased the property, these treasures were returned, making possible a completely original restoration of the building, at least in the visible elements. Philip Gresham was selected as contractor to do the work. His interest in the reconstruction went far beyond that usually required of a mere contractor. The cottage tower, leaning more than a foot and a half off center, received priority attention. The minutes of the Historical Committee for May 9, 1952, tell why: "Mr. Gresham, the contractor, spoke with enthusiasm for what had been accomplished, told of how he found the tower and its condition now. His talk was filled with references to termites, dry

rot, and fungus and was illustrated with horrible examples of the infected lumber. 'If nothing had been done,' he said, 'the building would not have stayed up another year and the tower would have fallen during the recent earthquake.' The tower has now been righted, timbers restored, roof shingled in the original style, and the bees coaxed out leaving behind some 75 lbs. of honey."

Also mentioned at this meeting was the fact that "Lucky" Baldwin's tallyho — then at Fallen Leaf Lake — would be delivered "to the committee as soon as the roads are open, which will be about June 1st . . . The committee then adjourned to see the good results accomplished in the restoration of the Casino and enjoy refreshments of sherry, Dubonnet, beer and cookies served on the greensward."

Concrete pillars were installed beneath the tower and all structural members at ground level were replaced with treated timber to prevent a recurrence of the termite and dry rot damage evident at the start of work. Work on the rest of the cottage progressed at a steady pace and restoration was completed in June, 1953.

Original color schemes for each room, determined by the stained glass windows in that room, were adhered to as much as possible. The refitting of the fireplace facings — many marble pieces packed in the cartons without any pattern — presented a challenge quite similar to that of a complicated jig-saw puzzle. They were a simple matter, however, when compared with the floor tiles in the entrance hall. These intricate tiles had been removed and simply packed in containers with no pattern to guide in their reconstruction. During the initial phase of the cottage restoration, the cement pad on which the tiles were originally laid had been removed and sent to the dump. Then, someone sudenly realized there *was* a pattern — the discarded cement! A search party raced to the dump on a retrieval mission. Luckily, a full quarter section was found and from this the tile pattern was pieced together perfectly.

The cottage refurnishing had been a lengthy process and is still going on. It was the consensus of the Historical Committee that all furnishings, if not original, should recreate as much as possible the appropriate feeling and style of the Baldwin era. Maurice Block, who had been in charge of furnishing the nearby Huntington Library, also directed the initial furnishing of the cottage. During the time he was in charge and since, many people have donated articles or made items available for purchase. Dedication ceremonies for the Queen Anne Cottage were held on the afternoon of May 18, 1954, with Samuel Ayres, Jr., presiding. State Historian Aubrey Neasham dedicated the cottage as State Historical Landmark #367. From the minutes of the Historical Committee comes this report on the afternoon's events: "The 125 persons present at the meeting could have desired no more inspiring setting than the semi-circle beneath the fine old English white oak, with its gracefully swaying boughs filtering the sunlight and touching the shoulder of President Ayres as he rose to conduct the meeting. Superintendent George Spalding's report on the extensive planting within the year, and Doctor Seibert's promise that the Arboretum will be opened to the public on Sunday afternoons this coming autumn gave proof of real progress . . .

"At four o'clock the guests assembled outside the gleaming red and white Cottage, where Mrs. Richard Y. Dakin and Mrs. John R. Mage, co-chairmen of the Historical committee, with Maurice Block who had charge of restoration, Supervisor John Anson Ford, and Dr. Russell Seibert participated in the rites which marked

the first triumph in this preservation of the romantic and colorful past. A great granddaughter of Lucky Baldwin, granddaughter of Anita, was present to view the splendor of the Cottage as it stood in its heydey. Lavish furnishings of the period, with restoration of some of the original marble, made the rooms opulent and resplendent, all that might be expected to be found within such a dazzling exterior. The Victorian garden was charming in the light and shadow of late afternoon. The pretty sight of the red-and-white costumed young girls offering songs of the Lucky Baldwin era, and the regalement at an attractively appointed out-door table . . . revived an atmosphere of hospitality akin to that of the entertaining for which the Rancho was renowned in earlier days . . ."

The exceptional manner in which the Queen Anne Cottage was restored led to the decision by the State to undertake the restoration of the Coach Barn and Hugo Reid Adobe. Susanna Bryant Dakin and Russell Seibert made a number of trips to Sacramento for hearings and meetings with committees of the state legislature. These appearances assisted materially in obtaining favorable action on a bill to provide funds for the restoration when it reached the floor.

The Coach Barn, dating from the early 1880s, was the first building to be restored with State funds and under State direction. A considerable amount of termite damage had occurred in the structure and the entire floor of the carriage area had to be replaced. Great care was taken to hide any evidence of modern improvements. Lighting fixtures were recessed in the ceiling and the switches placed inconspicuously in the walls. The circuit-breaker units were concealed in the wall of the stable area.

To enhance the Coach Barn restoration, W. W. Robinson had suggested to the Baldwin heirs that the old carriage, or tally-ho, often used by "Lucky" Baldwin to transport his visitors from Los Angeles to Rancho Santa Anita, be donated to the Arboretum. Restoration work on the carriage was done at Soledad State Prison. The original colors had been obscured by several coats of paint and the metamorphosis from a dull and dingy black vehicle, to a shiny, deep-blue carriage trimmed in red was astonishing. The restored equipage looked as smart — perhaps smarter— than when Baldwin received it in San Francisco after its long trip around the horn. Baldwin had ordered this English-built vehicle, a "Cadillac" of its day, at the 1876 Philadelphia World's Fair. It may have been the first English carriage in California. Today it stands proudly on display in the Coach Barn.

Restoration of the Adobe — complicated by the fact that there was no single authoritative source of information as to the building's original appearance or floor plan — was a matter of long and earnest study, and sometimes sharp disagreement. Many of the later owners had made additions to the original structure, and it was obviously quite altered from the Hugo Reid period. After considerable research and discussion, nevertheless, it was the recommendation of the Historical Committee, unanimously approved by the Board of Trustees, to restore the building as closely as possible to its original appearance in the early 1840s. This meant a careful scrutiny of all documents — letters, books, journals — pertaining to the building, its inhabitants, or similar California adobe structures of the 1839-1845 period. It also meant an archeological excavation of the adobe, right down to the foundations, to determine the original floor plan. Expert specialists in history and architecture were consulted . All later additions, including the frame west wing added by Bald-

win were razed. Several nearby trees which had not been available in Southern California at the time the adobe was built were removed. Before work began, a large roof was built over the entire structure as protection against wet weather. Then came the complete rebuilding, not a mere restoration, of the adobe itself. This included walls, roof, windows, doors, flooring, using original materials and methods whenever possible. W. W. Robinson's minutes for the Historical Committee meeting of March 19, 1959, give some idea of the exacting nature of the adobe restoration: "Adjourning to the Hugo Reid Adobe area, the Committee, under the guidance of Mr. Orvel Johnson, State Supervisor of Restorations and in charge of the adobe project, watched actual reconstruction work.

"Stepping inside the adobe walls, they looked up to the roof being constructed. They saw canes being laced on the horizontal poles with strips of rawhide. The poles had come from the Angeles National Forest. Part of the cane had been obtained from the San Fernando Valley and part from the Rio Hondo. The hides themselves — 15 of them — had been bought at the China Institute and then cut with butcher knives. Upon the laced-down canes grass is to be placed, then a layer of mud, then an unseen half-inch of plywood — this last a concession to modern practicality to prevent leakage. On top of this will be placed brea from La Brea Tar Pits. Watching all this intently, Dr. M. R. Harrington was heard to comment: 'That is the way it was done in the old days.'

"The thresholds and lintels, Mr. Johnson informed the Committee, were handhewn from Arboretum logs. The completed structure will have many of the original adobe bricks.

"Stepping outside, the Committee watched the actual making of adobe bricks. Mud for 5000 bricks came from a slope above the flower garden. Sand and wheat straw (and a little cement) were added, mixed together, and put in rows of wood forms. At the end of a day the forms can be removed, leaving bricks 10x20x4½ inches. 2700 had been finished and ready for the encircling wall. The house itself will be whitewashed, as shown by samples." And then, characteristically, "The Committee adjourned to refreshments of sherry and cakes."

Plans also called for an adobe-walled patio adjacent to the west and south sides of the adobe building. Within this enclosure was a grapevine-covered ramada, an outdoor oven, a cooking area, wine press and dining space. Cuttings from one of the old mission grapevines were obtained for the ramada from Rancho Santa Ana Botanic Garden in Claremont. Outside the walls were built replicas of typical brush huts, or *jacals,* which Indian ranch hands in the early days may have lived in. A corral was also built and this became the home for a burro which later was a great favorite with young visitors. The restoration of the adobe took about two years. Hardware, fixtures and accouterments were primarily handmade, and much effort was spent locating authentic originals to copy. Throughout the construction period the California Division of Beaches and Parks took considerable motion picture footage which was edited into a thirty-minute color film entitled "Heritage." The film is still shown during orientation programs for Arboretum volunteers and to other interested groups.

Furnishing of the adobe was accomplished by the Pasadena Committee of the National Society of Colonial Dames of America in California, with Gregor Norman-Wilcox supervising the acquisition and arrangement of the pieces. Formal dedi-

cation of the completed structure took place on May 5, 1961 — Cinco de Mayo — and the well-attended ceremony was carried out with an early California-Mexican theme and decorations.

Soon after, a Victorian rose garden was created adjacent to the Coach Barn in order to display properly those roses which were available during the Baldwin period. On each side of this charming rose garden were planted orange trees. If subdivision continues at its present pace, this may be among the few remaining citrus groves in this area for the younger generation to see.

A final major addition to the Arboretum's historical area came about through the acquisition of the original Santa Anita Railway Depot, built by "Lucky" Baldwin in 1895. For many years the old brick depot sat abandoned on the north side of Colorado Boulevard, just across the road from the Arboretum. When it was announced in 1967 that the depot was in the direct path of a proposed freeway, the Arcadia Historical Society, Arcadia Chamber of Commerce, California Arboretum Foundation, and a group of concerned citizens banded together to raise funds to save the station and move it to the southeast corner of the Arboretum in the Hugo Reid parking lot. A fund raising campaign spearheaded by a group of hard-working citizens brought in about $32,000, but this fell short of what was needed. Nevertheless, with some donated labor and some additional help from the County and the Foundation the project was accomplished.

The original plan involved moving the building as a unit, but it soon became apparent that the brick structure had deteriorated to a point where it would fall apart if moved. The bricks were soft and the old mortar was crumbling. The structure was dismantled and divested of all wooden window and door frames and all other wooden parts still in good condition. Then the depot was taken apart. The original bricks were cleaned, transported to the historical area, and the depot was put back together again — a prodigious feat. Formal dedication ceremonies were held September 25, 1970. The reconstructed station is a tribute to the many people who donated money, time, knowledge, and fine workmanship to the project.

III

SEARCHING FOR ANSWERS

Research Projects at the Arboretum

SINCE the Arboretum gates were first opened to the public, millions of visitors have passed through the grounds, viewing the plant displays, enjoying the historical buildings, being amused, perhaps, by the antics of the birds, or struck by the loveliness of the specimens inside the orchid greenhouse. What most visitors do not see, however, are the many research projects being carried out at the Arboretum. Scientific research has been conducted at the Arboretum for more than twenty years and is one of the institution's primary responsibilities under the original list of objectives drawn up at the time of founding.

Since it was the lack of color in the Southern California landscape that had originally inspired Sam Ayres with the idea of creating a botanic garden or arboreturn that would make possible the scientific introduction of flowering plants, this aspect of horticultural research has received major attention.

The first official introduction was *Felicia* 'Santa Anita' originated by Quinn Buck, Arboretum plant propagator. One hundred seedlings of *Felicia amelloides,* commonly called a marguerite, were treated with colchicine, and when they bloomed, three were judged worthy of further consideration. Of these only one plant, given the cultivar name of 'Santa Anita,' was finally selected for introduction in 1958.

In 1953 Sam Ayres brought back seed of the floss silk tree *(Chorisia speciosa)* from a trip to South America, which the Arboretum then propagated and grew on the grounds. Up to this time only a few of these trees were available, but with the spectacular flower display produced each year from early September through November, the tree has become a favorite in Southern California.

The Arboretum seed bank received a major addition in 1958-1959 when Superintendent George Spalding spent six months in Australia for the United States Department of Agriculture on a plant exploration trip which produced 137 accessions, mostly acacias and eucalypts. Further additions were made by Director William Stewart in 1959-60 when he spent six months in Australia and New Zealand on a Fulbright Fellowship, again in 1961 when he spent another four months in South Africa, and finally in 1964 when he received a second Fulbright Fellowship and taught at the Balwant Rajput College near Agra, India.

From the large number of plants grown and tested at the Arboretum, 58 species and varieties have been considered worthy of introduction.

Among the more colorful and widely used are the golden trumpet tree *(Tabebuia chrysotricha),* crown of gold tree *(Cassia excelsa),* gold medallion tree *(Cassia lepto-*

phylla), all from South America; the blue hibiscus *(Hibiscus huegelii)* and flaxleaf paperbark tree *(Melaleuca linariifolia)* from Australia; and the trailing African daisy *(Osteospermum fruticosum)* and cape weed *(Arctotheca calendula)* from South Africa.

In 1965, 19 lilac hybrids developed for Southern California weather conditions were introduced by the Department through its Descanso Gardens facility in La Canada.

From the time the first packet of seed was received in 1949, to the end of 1971, accessions have totaled 42,848 as of December 31, 1971. Of these, 5,973 have been added to the Arboretum's permanent plantings.

The longest research program, started in 1950 and still continuing, is that of testing plants for their fire-retardant properties, an investigation of great potential benefit in the dry, hilly areas of Southern California where nearly every summer or fall at least one disastrous fire occurs. By means of lectures, publications, and news stories to the press, the fire-retardant and erosion-control properties of 30 tested plants have been made available to the public. Testing of fire-retardant species has also been done in cooperation with the U.S. Forest Service and the Los Angeles County forestry and fire officials in various areas of Southern California. Often equally damaging as the fires themselves are the floods and landslides that follow and resulting work at the Arboretum in the field of erosion control has proven of great value to the property owners of Los Angeles County.

Experiments using gibberellic acid on Thompson Seedless grapes to increase size of fruit and promote better spacing were conducted by William Stewart and Francis Ching in 1956 and 1957. This original research work was later used successfully by the Riverside Citrus Experimental Station. Impact on grape production in California was considerable.

The effect of air pollution on plants has been a continuing area of concern at the Arboretum. Studies of various aspects of the interrelationship between plants and smog have been conducted for over twenty years, with some surprising findings. Very recent investigations on the effect of smog on plants has shown that under control conditions and with a combination of certain plants, smog can be absorbed and reduced possibly by as much as 30 percent. It has also been demonstrated that plants with a relatively high vitamin C content are more smog-tolerant than those with a relatively low vitamin C content.

In 1966 the research division inaugurated a study of *Armillaria mellea,* the oak root fungus that is destroying many native oaks and other trees and plants. It is now believed that some 90 percent of the ornamentals grown in Los Angeles County as well as 700 species of plants throughout the world are susceptible to this disease. At least three chemicals have been shown under Arboretum laboratory conditions to control this disease without harm to plants. More testing is planned. The Arboretum's plant pathologist has also initiated work on resistance to virus infection in plants.

Turf grass research was begun in 1950 and, in addition to the establishment and maintenance of test plots of various grasses, has included studies in automatic irrigation control; improved management practices for hybrid bermuda, dichondra and other lawn grasses; selective herbicides for control of crab grass, dallis grass and

kikuyu grass; studies of the use of fertilizers, soil amendments and soil penetrants in lawn care.

Over the years the Arboretum has engaged in cooperative research with many governmental groups and private companies. One such project in 1952 was the testing of Monsanto's Krillium Soil Conditioner, a product which had been developed to improve soil textures, particularly heavy clay soils. The tests did not show Krilium to be particularly effective, but they did successfully demonstrate the product's uses and limitations.

Another research project which took place in the early 1950s was the test program, in cooperation with the United States Department of Agriculture, on the relative hardiness of thirteen species of *Strophanthus,* a potential cortisone-producing genus of plants from a region more tropical than Southern California. The U.S.D.A. was interested in finding areas suitable for growth in the United States. A total of 113 plants were received from U.S.D.A., but only one species survived the first winter outdoors, and it was not one of those desirable for cortisone production. The project did, nevertheless, eliminate one major climatic area from the list of possible growing sites.

The development of a plant breeding program began with the formation of a Camellia Research Committee, a group of private citizens with special interest in camellias, who banded together to raise funds to support a camellia project. The program had three objectives: The improvement of resistance to cold; the broadening of the color range, with particular emphasis on introducing yellow as a basic color; and the development of fragrance. This program will continue. Thus far four camellias have been introduced to the nursery trade from among 20,000 seedlings. The cold-hardiness program has now been transferred to Longwood Gardens in Pennsylvania, and the color program has been de-emphasized as yellow pigments have not been detected.

With the employment in 1968 of a full-time geneticist new programs are under consideration aimed at improving plants now being grown, and at developing improved forms by hybridization, selection and artificially introduced mutation. The future appears bright for development of better varieties of trees and other plants for gardens, parks and streets in the community .

On June 4, 1970, the long awaited and much needed research laboratory building was completed, thereby consolidating research efforts under one roof. Offices and laboratories are situated around an inner court with a large lily pool open to the sky and complemented with *Rhapis humilis* palms and cycads. Over 8,000 square feet of office and laboratory space containing the latest equipment is available for projects involving soil science, pathology, virology, air pollution, taxonomy, breeding, genetics, plant physiology and plant ecology.

Some years ago, space was made available at the Arboretum to house an embryonic herbarium which has now grown to include 10,000 mounted and 20,000 unmounted specimens. The herbarium is, in essence, a library of plant specimens — dried, pressed, mounted on sheets, labeled and identified. It is a basic source of information for botanic and horticultural research and a vital part of the collections, providing taxonomic identification of all plant materials on the grounds. Field labels sometimes are lost and without the herbarium, identification of some plants would be difficult. Occasionally, seeds and plants are received which have been incorrectly iden-

tified at the source, and it is only through a check of existing literature and comparison with herbarium specimens that accurate identification can be made. The herbarium also provides a specimen of all Arboretum plants which have been grown, discarded or have died, so it is a complete record with sample of plant for exact identification.

The Arboretum's herbarium is a major horticultural herbarium specializing in the subtropical, woody, introduced plants that now comprise virtually all of the cultivated landscape material found in Southern California. In the past several years, the collection of pressed plants has been utilized by taxonomists writing papers on *Acacia* and *Erythrina,* and others who are doing research on *Eucalyptus, Myoporum* and the cultivated trees of Southern California. It has also been used extensively by students.

Arboretum research projects for the 1970s have been broadened to better serve the public and the needs of an area of seven million people. This means research programs geared to community problems and concerns. It means further investigation of erosion-controlling and fire-retardant plants, and the development of greenbelts on Southern California hillsides. It means even more intensive studies into plants and air pollution; into pesticides and ecosystems; into the development and introduction of colorful ornamental plants; into the practical uses of waste effluents and reclaimed water in the development of parks and agricultural areas. It also means better uses and broader understandings of the plant world around us — a world upon which our survival depends.

IV

FRIENDS ALONG THE WAY

Foundation and Community Support

THOUGH the Arboretum is a public, tax-supported institution, it could not have developed to its present size, scope and importance without aid from the private sector. Most of that aid has come by way of the nonprofit California Arboretum Foundation, Inc., and that organization's many members and friends. Through the Foundation has come the necessary funding and the support for programs which otherwise might never have existed. No chapter, no book, can adequately describe or pay tribute to the hundreds of Foundation members and friends whose time, energy and gifts have assisted the Arboretum over the years.

Fund-raising by the Foundation has taken many forms, and gifts have ranged from large to small; from outright monetary donations, endowments and bequests, to gifts of land, art works, buildings, furnishings and plants.

Foundation-sponsored events have included the garden tours of the early 1950s organized by Mrs. William D. Shearer, to social gatherings, flower shows and plant sales, right up to the very recent "Baldwin Bonanzas." The Foundation's gift shop, eating facilities, donation boxes — even the nickel vending machines where visitors can buy corn to feed to the insatiable peacocks and ducks — have produced revenues to sustain Arboretum activities.

One noteworthy land gift of the 1950s was the 156 acres in Cloverleaf Canyon in the foothills above Monrovia, given to the Arboretum by Dr. George P. Lux. The valuable acreage is now called the Lux Arboretum and used primarily for Arboretum experimental programs.

Among some of the important donations also made in the mid-1950s was the gift from Lyman McFie of several large and valuable *Phoenix reclinata* palms, together with funds to cover the cost of moving them. These are now a prominent feature near the main Arboretum entrance. Later, McFie also donated other plants, including a very large clump of *Chamaerops humilis*.

In 1955, Samuel Mosher of Dos Pueblos Nurseries, Arthur Freed, and Lyman McFie made gifts of *Paphiopedilum (Cypripedium)* orchid plants to the Arboretum. Of necessity they were housed under the benches in the propagation house — there was nowhere else to put them. The same year McFie also donated funds to construct the first units of a planned four-house orchid range which, when completed, would provide proper growing conditions for the orchid collection — certainly an improvement over the propagation house benches. The family and friends of John F. Douglas donated another orchid house, Mr. and Mrs. John Garland a third, and

Mrs. Archibald Young a fourth. Each of these glasshouses is 16 by 40 feet, and each provides different temperature and light environment. Mrs. Young also provided the Italian stone pines lining both sides of the forecourt turf panel and framing the entranceway vista.

Not long after this, the Southern California Chapter of the American Begonia Society donated an 18 by 50-foot glasshouse with fully automatic controls to house begonias. A sizable portion of these funds came from Mrs. Elvira Slossen and, later, from her estate. The Begonia Society's San Gabriel Valley Branch, in particular, donated numerous begonias to provide the Arboretum with a fine collection of these popular plants.

In 1958, Mrs. Harry J. Bauer, an active, longtime member of the Board of Trustees, accepted chairmanship of the Board of Councilors, a body established under Foundation bylaws to assist the Trustees in any manner requested. Over several years the Councilors contributed in many ways to the improvement of the Arboretum. In 1960, artist Millard Sheets was commissioned to draw up an ambitious, dramatic design for an entranceway area. The plan called for a pool at the east fence with adjoining marble walls, and a grass panel planked by walks leading to the central feature—a large, square pool at the center of which was a single, sixty-foot-high water jet. The plan then provided for another grass panel bordered by walks that led to a final pool and terrace at the west end. In memory of Mr. Bauer, Mrs. Bauer donated funds for the central pool and a marble terrace surrounding it, and Lyman McFie donated the entranceway pool with its marble walls. Both of these projects were completed in 1967.

In 1960, the Santa Anita Highlands Garden Club donated funds to design and construct a small stream on the north slope of Tallac Knoll. A series of steps descends the hill beside the stream which ends in a small pool, all constructed of Palos Verdes stone. The following year the club also provided funds for an attractive glade with a bird feeding station and bench as a memorial to Mrs. Gretel Bertholet, member and organizer of the Garden Club and an active supporter of the Arboretum from the early days.

Although the day-to-day management of the grounds was relinquished in 1953 to the County, the increasing activities of the California Arboretum Foundation made it evident by 1955 that a full-time executive secretary was needed. In 1955, Mrs. Lee Wray Turner, for many years in charge of arranging film locations on the grounds — scores of motion pictures, including some early *Tarzan* films, TV shows and commercials have been shot at the Arboretum — was appointed first executive secretary of the Foundation. She was succeeded by Mrs. Dolores Hubbell in 1960. Over the years the Foundation has expanded its activities and it now has a staff of four full-time employees handling an ever-expanding workload in its administration and support of many projects — visitor facilities and grounds transportation, film location supervision, plantings and gardens additions, publications, and research grants.

In January, 1967 a group known as Las Voluntarias was formed primarily to assist in the maintenance and upkeep of the Arboretum's historical buildings. As the official volunteer organization of the Foundation, the membership now consists of more than 150 women working in all divisions and sections of the Arboretum. New volunteers remain provisional members until they have worked a certain period of time and have completed the orientation course in the fall of each

year. Membership in the California Arboretum Foundation is a requirement for all volunteers. This does not include provisionals.

An auxiliary of Las Voluntarias called Los Ayudantes (the helpers) was formed in 1968 for volunteers who wished to help at the Arboretum, but who could not fit their schedules to that of the parent group. Members of Los Ayudantes have given many hours to the volunteer program at the Arboretum.

The death of Manfred Meyberg in 1956 brought to a close a life devoted to horticulture and allied interests. Meyberg, a Foundation Trustee, was owner of Germain's Seed Company and active in the Southern California Horticultural Institute and the International Flower Shows held at Hollywood Park. Following his death, Mrs. Meyberg and friends of the family set up a memorial fund to be used at the Arboretum. In 1969 a waterfall, named in his memory, was constructed on the north side of Tallac Knoll and has become one of the more popular features on the grounds. The main fall is twenty feet high and, with adjacent cascades, is a spectacular sight. After the completion of the main fall, Mrs. Meyberg and family gave additional funds for development of the Aquatic Garden on the knoll above the falls. This project was completed in 1971, and so constructed that the entire area — garden and falls — appears to be a single unit. A new project has been started that will complement the Meyberg Falls and add new beauty and horticultural interest to the area. It is a combined meadow and 1,000-foot brook that will start from the base of the falls and follow a winding course to an outlet near the present upper pond that is nine feet lower. Constructing the stream bed, contouring the land and preparing it for the varied plantings that have been planned add up to a major project for which Los Angeles County and the California Arboretum Foundation have supplied the funds. It reflects the even greater role the Foundation is playing in developing the Arboretum through the initiation and execution of fund-raising events that bring pleasure to the public and significant help to the garden.

V

GARDEN OF KNOWLEDGE

The Arboretum as a place of Publishing, Teaching and Learning

ONE of the original aims of the Arboretum was to publish pamphlets and brochures of a horticultural, botanical, and historical nature. In 1950, a committee appointed to develop a publishing program recommended the publication of a quarterly journal, setting October, 1950, as the date for the first issue. The title of the new quarterly was *Lasca Leaves* (Lasca being drawn from the initials of the Los Angeles State and County Arboretum). The California Arboretum Foundation was to provide financial support for the new publication which would contain many useful and informative "leaves" as the years went by. Volume I, Number 1, appeared on schedule in October, 1950. *Lasca Leaves,* now in its twenty-third year, is still going strong.

The first issue, something of a collector's item today, was a modest eight pages. On its green and white cover was a delicate drawing of the *Ginkgo biloba* leaf, and inside were six articles, beginning with one on the Arboretum itself by Director Russell Seibert. This was followed with a discussion of the historical buildings by Susanna Bryant Dakin, a piece on *Washingtonia filifera* by William Hertrich, an article on Arboretum birds by W. Dan Quattlebaum, the first in a series of "Growing Notes" by George Spalding, and an unsigned cover story on the ginkgo. Also included in this maiden issue was a list of gifts from various donors, received between October 1, 1949 and June 30, 1950. Among these gifts were more than 150 books and pamphlets (including 35 books on roses), some 100 plants, 315 packets of seed, one manuscript on New Zealand trees and shrubs, several original drawings and paintings, two plant urns, slides, a projector and screen. Also listed were two bags of Georgia peat, one sack of sponge rock and three bags of steer manure. Useful gifts all!

Russell Seibert was *Lasca Leaves'* first editor, producing the initial two volumes and the first issue of volume three. Janet Wright, the Arboretum's part-time librarian took over the editorship in April, 1953 (at which time the Southern California Horticultural Institute became a co-sponsor of *Lasca Leaves*). She continued as editor until October, 1955, resigning both of her positions to enter a religious order.

The first issue of Volume VI (1956) was edited jointly by Mrs. Rusella McGah, the first full-time librarian, and Louis B. Martin, Arboretum plant physiologist and later chief of the Education Division. Martin assumed sole editorship beginning in 1960 and continued in this capacity until the summer of 1963.

The last issue edited by Martin (Volume XIII, No. 2) in 1963, was also the final issue to be published jointly with the Southern California Horticultural Institute. Thus, *Lasca Leaves* again became solely a California Arboretum Foundation publication. A search began to find a new editor and Maria Stewart, wife of Arboretum director William Stewart, volunteered her services in the interim.

Robert Atkinson, garden editor for The Los Angeles Times, was appointed editor, effective with issue No. 3 of Volume XIV (Summer, 1964). Dr. Atkinson introduced issues devoted to a single subject in the interest of bringing a more thorough examination of whatever was selected. As interesting as these issues were, however, Atkinson lived and worked in an area of the county some distance from the Arboretum which presented problems in reviewing copy, checking proofs and other details of publication. At the end of his second year's contract it was decided to seek an editor closer at hand.

In the summer of 1966, Davis Dutton, the newly employed head of Arboretum Information, was selected to edit *Lasca Leaves* which he did until he left the Arboretum to give attention to a family business. Later, he became editor of *Westways* magazine.

Then, in 1968, Donald Dimond, chief of the Public Services Division, took up the editorship, bringing about changes in format and design which were the start of a continuing effort to enhance and update *Lasca Leaves* without changing its fundamental character. A new masthead, two new departments, and an editorial page were added. In 1971, *Lasca Leaves* became a publication representing the Department of Arboreta and Botanic Gardens and each of its facilities throughout the County of Los Angeles. Still published by the California Arboretum Foundation, *Lasca Leaves* currently features articles on horticultural subjects by staff and guest writers, guest book reviews, and notes on department activities written by the editor.

In addition to *Lasca Leaves,* the publications committee also provided for occasional and special publications by authorizing a series to be called *Lasca Miscellanea.* The first to be issued in this series was an index for the book, *A Botanist in South Africa,* by John Hutchinson. The index was prepared by George Spalding and was printed by the A. B. Dick Company in an edition of 200 copies. About 150 of these indexes were sent to other botanical institutions, the balance being offered for sale by the California Arboretum Foundation. *Lasca Miscellanea* numbers two through five were annual reports of the Department of Arboreta and Botanic Gardens.

One of the earliest projects undertaken by the staff was the editing for publication of the notes left by the late Peter Riedel of Santa Barbara. Riedel, one of the horticultural pioneers of Southern California, was compiling data for a book based on his experiences at the time of his death. A grant from the Harvey Foundation of Santa Barbara made possible the editing and publication of these worthwhile research notes.

It was the Arboretum's good fortune that its organizing director, Frans Verdoorn, had considerable professional knowledge of books—both as publisher and bibliographer in the fields with which the Arboretum was primarily concerned. During his brief tenure, approximately one thousand volumes were assembled as the nucleus of an Arboretum library.

A library committee was appointed in July, 1950. The committee's first job

was to review lists prepared by the Massachusetts Horticultural Library and select books suitable for the Arboretum. The library was developed primarily to assist the staff in their work and research, specializing in horticultural and historical materials that pertain to the Arboretum that are also of value to the general public. It is open and available to the public for reference every weekday.

In the years since the library was established, a number of valuable books and manuscripts have been acquired. Some contain original research notes of great value to researchers and students. One gift of major importance was received from Mrs. Helen Krauss and consisted of 46 volumes containing photostatic copies of all the literature on begonias published throughout the world. This was the research material on which Mrs. Krauss based her book *Begonias for American Homes and Gardens.* There are only two copies of this compilation in existence, the other being in the library of the New York Botanical Garden.

The library today contains 17,000 books and pamphlets, and regularly receives some 525 periodicals, running the gamut of botany, horticulture and allied subjects. Some of these come through subscriptions, some in exchange for *Lasca Leaves.*

It would not be inaccurate to say that every activity at the Arboretum ultimately falls under the heading of education or public services or both. Education takes many forms, ranging from simple but informative plant labels to beginning and advanced classes in horticulture for young people and adults. Public services range from daily informational services and narrated tram tours (over 150,000 passengers a year, a figure limited only by the availability of personnel and vehicles), to carefully structured school field trips.

School field trips began on a modest scale in 1950 and have since grown steadily, becoming a basic part of the curriculums of school districts throughout the area. Field trips are conducted by trained tour guides in the Public Services Division and by members of Las Voluntarias. More than 25,000 school children from 60 Southern California cities now attend tours each year — a most impressive increase over the 1,750 children conducted through the grounds the first year. A high percentage of these children are from inner city and ghetto schools, and the Arboretum is continually seeking ways to develop tours and enrichment programs designed for the special needs of these students.

A formal youth education program was inaugurated early in 1959 by Gertrude Woods, currently chief of the Education Division. After-school and Saturday workshops were offered for children from six to fifteen years of age and have included short courses in nature study, weather, lagoon life, birds, botany and gardening. The old, "temporary" administration building served, and still serves, as a classroom. Garden plots were developed near the building, and in 1960 the Casamajor Greenhouse (given by the family of Robert Casamajor in memory of the longtime Foundation member and president of the Board of Trustees) was donated along with an anonymous gift of $1,000 to further develop a children's education facility.

The children's program has been a phenomenal success. In fact, its popularity has created space problems and consistently forced limitations on enrollment — in all cases classes are oversubscribed before they open. During a recent period sixty workshops covering eighteen subjects were offered for children from six to sixteen years of age. Seven-hundred and forty children were accommodated. As usual, many

children had to be turned away due to limited space and a lack of funds for additional teachers.

The adult education program, like its youthful counterpart, has been an unqualified success. Courses offered have grown from a single class in plant identification given in the summer of 1957, to a recent high of seventeen. For the first class in 1957, some forty-one people registered. For 1971-72, classes were offered in such subjects as beginning and advanced bonsai, home horticulture, garden insects and diseases, herbs, plant identification, orchid culture, "down-to-earth art," sketching and water colors, home gardening, and flower arrangement. More than 600 adults registered for the year, and this does not include the classes at the department's other facilities, Descanso Gardens and South Coast Botanic Garden. Once again, only limited classroom space keeps this program from growing even larger.

Special classes have also been scheduled in conjunction with various government programs for training the unemployed, including the Work Incentive Program of the Department of Human Resources, the Manpower Development Training Act and the programs of the California State Department of Rehabilitation. This six-month training period consisted of a lecture phase, demonstrations and work assignments under the supervision of Arboretum staff and gardeners. To date, upwards of fifty men have received vocational training in garden maintenance.

In 1957, the California Arboretum Foundation - Sunset Magazine Demonstration Home Gardens were started on one acre north of the administration building. On a visit to the Arboretum, a *Sunset* editor mentioned that it was possible to go anywhere in Sotuhern California and see a furnished model home, but nowhere was there a furnished "model garden." This observation led to a decision by *Sunset* and the Foundation to develop a group of demonstration gardens to provide home owners with ideas they could employ in their own gardens.

Sunset made a survey of readers in the Arcadia area. Based on the results, *Sunset* prepared a write-up of four hypothetical, composite families with differing life-styles. A contest was held in which landscape architects could design a garden suitable for each of these families. The contest turned out to be a draw between plans submitted by Owen Peters and Bettler Baldwin. It was decided to award prizes to each and have them jointly develop a new plan incorporating desirable features of each of their original plans. The gardens were completed and dedicated in the spring of 1958 and were featured in a cover story in the June issue of *Sunset*.

Following the opening of the Demonstration Home Gardens, Arboretum attendance doubled almost immediately and continued to increase rapidly for several years. Today it is gratifying to see homeowners inspecting, photographing, sketching and taking notes and ideas home with them. Each garden is updated periodically in design, plant materials and furnishings.

Botanic and horticultural assistance is available through the office of the Botanical Information Consultant to anyone who visits the Arboretum or inquires by phone or mail. This office handles approximately 2,500 queries per year. Additional horticultural information is furnished the public through a "Plant-Of-The-Week" column published every Sunday in the Pasadena Star-News, a column now in its eighth year.

In 1963 a committee was appointed to investigate the feasibility of printing a flowering tree booklet, in full color, to acquaint Los Angeles residents—home-

owners or professional landscapers—with the variety of colorful trees that could be grown in the area. The California Arboretum Foundation, Southern California Horticultural Institute and Los Angeles Beautiful agreed to underwrite the first printing.

Before the flowering tree booklet was even completed, the idea of a series of booklets covering flowering shrubs, vines and ground covers was presented, and favorably received. At the same time it became clear that the returns from one booklet would not always be sufficient to finance the next one. The three sponsoring organizations then agreed to underwrite an additional $1,000 each to assure publication of the next booklet. To date, five booklets have been published and current plans call for a hardcover book incorporating all of the material in the present five booklets with some additional pictures and text. The late Ralph Cornell, one of the original incorporators and former president of the Foundation, furnished the color transparencies which were used to illustrate the five booklets. The selection of the additional transparencies had just been completed when this dedicated friend of the Arboretum died on April 6, 1972.

In response to the demand for literature on horticultural and related subjects, especially during the last several years, a long and varied list of brochures and other publications has been planned. Among those already published is a twenty-page booklet titled "Fire Retardant Plants for Hillside Area." About 20,000 of these have been distributed so far, the greatest number following the fires that ravaged Southern California hillsides in September of 1970. Others, like "Beneficial Insects," "Insecticides Around the Home," "Poisonous Plants," "Home Vegetable Gardening," and a "Guide to Pond Ecology," also remain in steady demand. Nearly all of these publications have been produced at modest cost, but their usefulness is incalculable. More are planned for the future.

Still another recent educational program that is expected to grow with the times is the new approach to Arbor Day, an approach designed to make the day one of meaning and significance. Traditional Arbor Day school ceremonies had become almost a matter of form with little value except the taking home of a seedling tree. Starting in 1972 (the one-hundredth anniversary of Arbor Day), the Education Division, with the assistance of Las Voluntarias, prepared a packet of resource information for teachers containing materials on the history of Arbor Day and information on trees, conservation and environment. This packet was distributed by the Arboretum to schools wishing to take part in the program. After studying various aspects of Arbor Day in the classroom, each school was given a tree in a five-gallon container to be planted with appropriate ceremonies. With some 400 schools taking part, it was estimated that more than 200,000 children gained new insights into the world of nature and its place in their lives. It is expected that increasing numbers of the 1.3 million students within the school districts of Los Angeles County will be served in the coming years.

Three very recent and popular, educational innovations are the "Mini Courses," the Sunday Morning Garden Walks and the Sunday Afternoon Lectures. The Mini Courses are billed as "Intensive, short horticultural classes for the busy adult." Rather than devote an entire semester to a subject, the "busy adult" can now get to the heart of the matter by signing up for three 3-hour sessions in any of several subjects—container gardening, indoor plants and terrariums, holiday decorations,

propagation, pruning ornamental plants, orchids, and hanging baskets. These intensive sessions involve concentrated learning and doing, and are proving quite successful.

Sunday Morning Walks give the visitor a chance to stroll through some designated portion of the Arboretum grounds, such as the Demonstration Home Gardens, the Aquatic Garden or one of the geographic plant sections, in the company of a staff expert who describes, explains and interprets along the way. The Sunday Afternoon Lectures are planned expressly for the home gardener and those interested in the environmental factors surrounding the growing of plants. Here, too, is a chance to spend several hours with a specialist in fields such as plant propagation, azalea growing, home vegetable or container gardening, or Australian plants suitable for Southern California.

In terms of numbers, millions of people have in some way benefited from Arboretum research, educational and public service programs — formal or informal, scheduled or unscheduled. Periodically updated and broadened, these programs can be expected to serve a future, larger population likely to be increasingly concerned with the urban environment.

Presidents of the Board of Trustees of the California Arboretum Foundation

Frits W. Went	1948 - 1952
Samuel Ayres, Jr.	1952 - 1955
Frits W. Went	1955 - 1958
Robert Casamajor	1958 - 1960
Ralph D. Cornell	1960 - 1963
F. Harold Roach	1963 - 1967
Arie J. Haagen-Smit	1967 - 1970
Ernest E. Hetherington	1970 - 1971
Donald Camphouse	1971 - 1972
Alice Douglas	1972 -

The photographers of the early pictures of the Arboretum which add so much interest to this history are, regrettably, unknown.

For the rest, we wish to thank William Aplin for his picture of the entranceway (opposite the Foreword), and for the picture on page 24 of the Santa Anita Depot as it is today.

We wish also to thank Milt Bell of the Arcadia News Post for his pictures of the fire shown on page 27.

We wish to thank Francis Ching for his color pictures on page 36 and for the view of the Demonstration Home Gardens on page 37.

Finally, we wish to thank H. Byron Churchill, a generous contributor to Lasca Leaves, *for his picture of the Coach Barn on page 38.*

BOOKSHELF

NARCOTIC PLANTS by William A. Emboden Jr., The Macmillan Company, New York, 1972; 168 pages. Illustrated, 95 color plates. $12.95.

For centuries man has made use of various plants for their hallocinogenic, stimulating, inebriating, or tranquilizing properties. He has even used them in foretelling the future, communicating with the deceased, receiving inspiration from the gods or transcending the rigors of a harsh environment.

Dr. Emboden has written a historical, botanical, and chemical account of these plants, which include marijuana, peyote, opium poppy, sacred mushrooms, tea, coffee, mate, cocoa, cola, coca, betel, nightshades, datura, mandrake, and numerous lesser-known species.

He uses the term "narcotic" in its broadest sense to include all plants which, by virtue of their chemical properties, induce altered states of consciousness. The proper term for plants falling under this definition probably should be "psychoactive," as suggested by the U. S. Public Health Service, and not narcotic. Narcotics as generally understood and defined are drugs that lessen sensibility, relieve pain and produce profound sleep, that when used constantly cause habituation, and that in large quantities produce euphoria, stupor, coma and even death.

Dr. Emboden writes engagingly, his material is fascinating, and the illustrations by Mrs. Frances Runyan are excellent.

It is only unfortunate that the book is not free from rather numerous and irritating errors. On Page 63, for example, the correct name for the Canary Island Broom is incorrectly stated to be *Genista canariensis* (it should be *Cytisus canariensis* as it appears on page 149). On pages 57, 150, and 169, the genus *Rhynchosia* is misspelled as *Rynchosia* or *Rhyncosia*. On page 140 *Anadenanthera peregrina* is said to belong to the family *Leguminosae*, but on page 153 to the family *Mimosaceae*. On page 150 the flowers of *Salivia divinorum* are described as being white but appear blue on the plate No. 50. On page 153 the leaves of *Tetrapteris methystica* are described as being obovate or oblong, but are ovate on the plant illustrated on plate No. 57.

It is also regrettable that none of the plant names mentioned on page 141 to 161 are indexed, making it extremely difficult to find their botanical description.

Nonetheless, the book is recommended as a reference to everyone who has more than a casual interest in psychoactive plants.

—L. Enari

RECENT ACQUISITIONS TO LASCA LIBRARY

VEGETABLES AND FRUITS, James Underwood Crockett. Time-Life Books, New York, 1972. 160 pp. color photos and illustrations.

MONOGRAPHIE DES MENISPERMACEAE AFRICAINES, G. Troupin, Scientifique En Afrique Centrale (I.R.S.A.C.), Brussels, 1962. Black and white illustrations.

INDOOR AND OUTDOOR AIR POLLUTION RELATIONSHIPS, Ferris B. Benson, Gov't. Printing Office, Wash., D.C., 1972. 73 pp.

RESULTS OF A BOTANIC EXPEDITION TO ARABIA IN 1944-45, Ahmed Khattab and M. Nabil El-Hadidi, Cairo University Herbarium, 1971. 95 pp, no illustrations.

WATER THE WONDER GUIDE OF LIFE, Rutherford Platt, Prentice-Hall, Inc., Englewood Cliffs, New Jersey, 1971. 174 pp., black and white photographs.

E. I. DU PONT, BOTANIST. Norman B. Wilkinson, The University Press of Virginia, 1972. 139 pp., black and white and color photographs.

CONTINENTS ADRIFT, Scientific American, W. H. Freeman & Co., New York, 1973. Black and white photographs.

ECHEVERIA, Eric Walther, California Academy of Sciences, San Francisco, California, 1972. Black and white photographs.

NONSEED PLANTS: FORM AND FUNCTION, William T. Doyle, Wadworth Publishing Co., Inc., Belmont, California, 1964. 240 pp., black and white photographs.

READING THE LANDSCAPE OF EUROPE, May Theilgaard Watts, Harper and Row, New York, 1971. Black and white illustrations.

CACTI AND SUCCULENTS INDOORS AND OUTDOORS, Martha Van Ness, Van Nostrand Reinhold Co., New York, 1971. 112 pp., black and white photographs and drawings.

THE DELPHINIUM, Frank Bishop, Collins St. James Place, London, 1949. 144 pp., color and black and white photographs.

ORGANIC GARDENING AND FARMING, Joseph A. Cocoannouer, Arco, New York, 1971. 147 pp.

An Arboretum is for people . . .

People visit an arboretum for different reasons — to study, to get ideas for their own gardens, or maybe just to enjoy the peace and quiet of beautiful surroundings.

Engineers, landscape gardeners, nature lovers, children, and photographers are just a few of the people who can find good reasons to see the Meyberg Falls at the Los Angeles State and County Arboretum.

SCE

Southern California Edison Company

Arctotheca calendula (L.) Levins, Cape weed, Cape dandelion (Cover)

A low-growing perennial or sometimes annual herbaceous plant from South Africa. The leaves are pinnately lobed, variable in the degree of incision, up to 3 in. wide, green and scabrous above, white or grey-woolly beneath, petioled. The flower-heads are bright yellow, up to 2¼ in. across, radiate, long-scaped, solitary, terminal or axillary. The pappus is of small translucent scales. The fruits are covered with dense silky hairs.

The original plant was received in 1963 from Sima Eliovson from South Africa. Mrs. Eliovson is a well-known author of several books on the wild flowers of South Africa, including **South African Wild Flowers for the Gardens.** The offsprings of this plant were distributed to the Foundation members at their 1965 annual meeting. In the same year they were also made available to the nurseries.

Arctotheca calendula is an extremely fast-growing ground cover. When planted 12 inches on center, it will provide a full cover within six months. This plant will grow well in less than favorable conditions, does equally well on slopes, flat areas or mounds and performs best in full sun. Establishing this plant is relatively easy as cuttings can be directly planted into the ground, or rooted cuttings from flats may be used. Frost will occasionally kill the tops but the plant will recover quite rapidly as soon as the weather warms. Plants start to flower in late February and bloom copiously in March, April and May, followed by light to moderate flowering from June to November. A well-established planting may be subject to root rot and occasionally to aphids, mites, slugs, and snails, but will usually sustain or recover from such blights without any treatment.

CALENDAR — Continued from page 60

April 29 — 9 a.m.
Sunday Morning Garden Walk
"Plants in Flower"
Armand Sarinana, superintendent
Edward Hartnagel, Assistant superintendent

May 5, 6 — 10 to 5 p.m.
South Bay Bromeliad Associates Show

May 6 — 2 p.m.
Sunday Afternoon Lecture
"Composting"
Edward Hartnagel, assistant superintendent

May 19, 20 — 10 to 5 p.m.
Silver Spur Garden Club Flower Show

June 3 — 9 a.m.
Sunday Morning Garden Walks
"Aquatic Section"
Armand Sarinana, superintendent
Edward Hartnagel, assistant superintendent

June 17 — 2 p.m.
Sunday Afternoon Lecture
"Lawns and Ground Covers"
Armand Sarinana, superintendent
Edward Hartnagel, assistant superintendent

June 22, 24 — 10 to 5 p.m.
SCBG Foundation Fiesta and Costa Verde Flower Show

ARBORETUM WEATHER

Long. 118°02'59" W.
Lat. 34°08'48" N.
Elev. 571.28 ft.

Weather season: Oct. 1 to Sept. 30

	December	January	February
Average daily maximum temperature	64.3	66.5	71.1
Average daily minimum temperature	40.5	40.6	48.7
Highest temperature	85	82	79
Lowest temperature	29	30	40
Number of clear days	19	19	15
Number of partly cloudy days	9	6	11
Number of days with rain	3	8	10
Rain during the month	2.05	3.86	9.87
Total rain since October 1	5.90	9.76	19.63

Calendar

April - May - June

ARBORETUM

(Note: Sunday lectures and walks and the minicourse series are sponsored by the California Arboretum Foundation which also serves as cosponsor of flower shows and Theodore Payne Foundation lectures.)

April 7-8 — 8 to 5 p.m.
Spring Flower Show
Sponsored by the Arboretum District of Garden Clubs, Inc.

April 16-19
American Association of Botanical Gardens and Arboreta Annual Meeting

April 15 — 2 p.m.
Sunday Afternoon Lecture
"Poisonous & Medicinal Plants"
Dr. Leonard Enari, senior biologist

April 21, 22 — 8 to 5 p.m.
Iris Show
Sponsored by the So. Calif. Iris Society

April 28, 29 — 8 to 5 p.m.
Amaryllis Show
Sponsored by the So. Calif. Hemercallis & Amaryllis Society

April 29 — 9 to 11 a.m.
Sunday Morning Garden Walk
"Tallac Knoll"
Dr. Leonard Enari, senior biologist
Frink Simerly, Arboretum Superintendent

May 1
Youth Education Classes
Summer session begins June 18
Write now for information

May 8 — 11 to 4 p.m.
California Arboretum Foundation
Annual Meeting & Fashion Show

May 13 — 8 to 5 p.m.
Epiphyllum Show
Sponsored by the Epiphyllum Society

May 20 — 2 p.m.
Sunday Afternoon Lecture
"Lawns and Groundcovers"
John Provine, Hortuculturist

May 26-28 — 8 to 5 p.m.
Bonsai Show
Sponsored by the Santa Anita Bonsai Society

June 3 — 2 p.m.
Sunday Afternoon Lecture
"Propagation"
Don Fitch, Arboretum Nurseryman

June 9, 10 — 9 to 5:30 p.m.
Rose Show
Sponsored by the Pacific Rose Society

June 16, 17 — 8 to 5:30 p.m.
Herb Show
Sponsored by the National Herb Society

June 23, 24 — 8 to 5:30 p.m.
Gladiolus Show
Sponsored by the So. Calif. Gladiolus Soc.

June 24 — 9 to 11 a.m.
Sunday Morning Garden Walk
"Asiatic/North American Section"
Dr. Leonard Enari, senior biologist
Frank Simerly, Arboretum Superintendent

June 30 — 8 to 11 a.m.
Hugo Reid Round Up

June 29, 30, July 1 — 8 to 5:30 p.m.
Cactus Show
Sponsored by the Cactus & Succulent Society of America

DESCANSO GARDENS

April 1 — 2 p.m.
Sunday Afternoon Lecture
"Composting"
Mark Anthony, superintendent and
George Lewis, assistant superintendent

April 5 - May 17
Spring Docent Class
For information call
Mrs. Clemens Taft 790-6545

April — 9 a.m.
Sunday Morning Garden Walks
"Native Plants, Flowering Fruit Trees"
Mark Anthony, superintendent
George Lewis, assistant superintendent

April 10 — 1-4 p.m.
Field trip to Harold Lloyd Estate
(Write Guild for information)

April 11 — 8 p.m.
Theodore Payne Foundation Lecture
"Native Plants"

April 29 — 3 p.m.
USC Brass - Choir Concert

May 8 — 9 - 5
Field trip to Protea Gardens in Escondido

May 27 — 3 p.m.
Concert
Glendale Symphony Orchestra

June 3 — 11 to 4:30 p.m.
Art festival on the lawn

June 10 — 9 a.m.
Sunday Morning Garden Walk
"Roses and Annual Flower Beds"
Mark Anthony, superintendent
George Lewis, assistant superintendent

June 27 — all day
California Association of Nurserymen

SOUTH COAST BOTANIC GARDEN

April 7, 8 — 10 to 5 p.m.
Youth Ecology Fair,
Girl Scouts of America

April 14, 15 — 10 to 5 p.m.
South Coast Cactus & Succulent Society Show

April 28, 29 — 10 to 5 p.m.
The Gardeneers Garden Club Flower Show

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Vol. XXIII
No. 2

Lasca Leaves

Sep 73

MISSOURI BOTANICAL

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Lasca Leaves

Published quarterly by the California Arboretum Foundation, Inc., for the Department of Arboreta and Botanic Gardens of Los Angeles County.

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Donald S. Dimond

Cover photo by Francis Ching

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department notes

AABGA MEETING

ALTHOUGH no poll was taken, there seemed to be a consensus among the 100 registered delegates from the United States and Canada that it was one of the busiest and most tightly organized meetings the American Association of Botanic Gardens and Arboreta had ever held, and though the timing, April 16 through April 19, was not the most convenient for those conferees thinking about planting back home, it did afford an opportunity to see a number of Southern California botanic gardens at the height of their spring season. For those who arrived ahead of schedule, there was a special all-day field trip on Sunday to selected areas within a 90-mile radius of Los Angeles to see fields of lupin, coreopsis, and other California wild flowers that were particularly magnificent this year owing to the heavy rains.

The proceedings began Monday with an early morning trip — 5 a.m. — to the Los Angeles Flower Market where Frank Kuwahara, general manager and a delightful host, served his visitors fresh orange juice, sweet rolls and coffee while telling them they were in the midst of a $40 million a year business supplied mainly by growers in California, Oregon, and Washington, but also from as far away as the Netherlands — tulips, of course — and Latin America. After about an hour of seeing superb specimens of cut flowers — Easter lilies, azaleas, caladiums, lilies-of-the-valley, everyone was bused to the Huntington Botanical Gardens for a sit-down breakfast followed by a brief history of the gardens presented by curator Myron Kimnach and botanist Fred Boutin. These gentlemen then each led a half of the group on a tour of this magnificent, beautifully cared-for garden.

After the Huntington, the conferees were bused to Descanso Gardens where they had lunch under the oaks followed by a tour of the grounds led by Mark Anthony, superintendent, and George Lewis, assistant superintendent. In the afternoon, Dr. Mildred Mathias, director of the botanical garden and herbarium at the University of California, Los Angeles, presided over a lively symposium on plants of Southern California with landscape architects Philip Chandler and Fred Lang, former South Coast Botanic Garden superintendent Don Woolley, Arboretum botanical consultant George Spalding, rare plant collector Paul Hutchison, native plant specialist Dave Verity, and botanist Fred Boutin showing and discussing specimens representing their special interests. That evening, something new was tried at the dinner in the Ramada Inn Banquet Room. Conferees were seated according to their interest in research, public relations, education, and maintenance, and were asked by chairman Myron Kimnach to zero in on one or two aspects of their chosen topic and be prepared to have a selected spokesman make a five-minute report following dessert. Considering the absence of parliamentary procedures and a tendency to socialize rather than take up serious matters, the rap session, as it was called, produced some interesting viewpoints. Perhaps most important it provided a forum for delegates to speak their mind.

The next day began with a tour of Rancho Santa Ana Botanic Gardens, preceeded by coffee and cookies and a short, welcoming address by Dr. Lee Lenz, the director, and then on to a tour of Monrovia Nursery comprising 350 acres of plants in containers, the largest nursery

Seeing Arboretum plants.

After-dinner rap session.

Time out for inlanders to view the Pacific.

At Rancho Santa Ana Botanic Gardens.

of its kind in the world. Following a fine outdoor luncheon, at which host Martin Usery, president, moved from table to table greeting his guests, buses were boarded again for a return to respective motels and a two-hour symposium on future directions of the AABGA. Joseph Oppe, director of the Arthur Hoyt Scott Horticultural Foundation at Swarthmore College was the chairman for this discussion led by panelists Angus Heeps of the Henry Foundation for Botanical Research at Gladwyne, Pennsylvania; Glenn Park, horticulturist from the Chicago Botanic Gardens; Dr. Richard Lighty, coordinator of the Longwood Program at the University of Delaware; and Carl Totemeir, director of the Bayard-Cutting Arboretum. The busy day ended with the AABGA annual banquet at which Dr. Arie J. Haagen-Smit, California's renowned expert on air pollution, spoke on "Smog, Plants, and People." Calling attention to the stringent and increasingly well-enforced automobile exhaust emission standards set by the California Air Resources Board which he serves as chairman, Dr. Haagen-Smit noted that in the long run people will just have to give up big cars if they truly want clean air.

The evening ended with the presentation of AABGA awards of merit. Among the recipients were departing AABGA president, Joseph Witt, of the University of Washington Arboretum, Seattle, who was presented with a plaque consisting of a board and gavel, the presentation made by Dr. Louis Martin of the Chicago Horticultural Society. On behalf of the California Arboretum Foundation, Mrs. Peter Douglas, president, received an award for her organization's outstanding example of a citizen support group. Awards were given to Dr. Samuel Ayres, Jr. and Dr. Henry Skinner for their many contributions to the world of horticulture;

Dorothy Hansell, for 17 years contributing editor and then editor in chief of the AABGA Quarterly Bulletin; and to Douglas Ritchie, an Ohio State student, for his outstanding scholarship in horticulture. Finally, Dr. Richard A. Howard of the Arnold Arboretum and new president of AABGA, presented Francis Ching, director of the Los Angeles County Department of Arboreta and Botanic Gardens, a specially potted imperial bonsai, *Chamaecyparis obtusa,* a cypress-like evergreen, for "our deep appreciation of a wonderful time at the meeting."

The next day, which still was only the third day of the meeting, was spent at the Los Angeles State and County Arboretum in Arcadia, and included a brief description of the functions of the Department by Francis Ching and four of his division heads, followed by a tour of the grounds and luncheon in the Demonstration Home Gardens with the California Arboretum Foundation serving as host. An afternoon symposium on education programs at arboreta and botanic gardens was chaired by Dr. Lee Lenz, director of Rancho Santa Ana Botanic Garden. The panelists were Jacqueline Broughton of Santa Barbara Botanic Garden who spoke on "The Role of the Botanic Garden in Youth Education"; Dr. Roy L. Taylor, director of the Botanic Garden of the University of British Columbia, who spoke on "The Role of the Botanic Garden in Graduate Education"; Elizabeth Scholtz, director of the Brooklyn Botanic Gardens, who spoke on "The Role of the Botanic Garden in Adult Education"; and Dr. Richard W. Lighty, coordinator of the Longwood Program at the University of Delaware, who spoke on "The Role of the Botanic Garden in Horticultural Education."

The final day was spent on a tour of Santa Barbara Botanic Garden under the guidance of D. Katherine Muller, director. After lunch, conferees wandered about on their own, then boarded the bus for the trip back, first stopping off for a look at the historic Santa Barbara Mission, some unusual plants at Orpet Park, and a pause long enough for some of the inlanders to dip their feet in the Pacific Ocean.

For the duration of the meeting, conferees, when they had the chance, could look at educational exhibits set up by eight of the participating gardens.

It was, as we said at the beginning, a busy four days, and if the conferees were a bit weary at the end they knew their time had not been wasted and they would return to their own gardens with memories of sights and discussions they would mull over in the weeks to come.

DESCANSO TRAM

The Clark tractor that draws the tram at Descanso Gardens has been overhauled and its carburetion system converted to the burning of propane instead of gasoline. This makes the second Department tram that has switched from gasoline as a fuel, one Arboretum tram having been converted early in 1969. Propane, or more properly, liquefied petroleum gas, is a mixture of several gases, principally propane and butane, with propane the main ingredient. It is transformed under compression into a liquid to facilitate transporting and storage. It becomes a vapor when used in internal combustion engines. It offers several advantages over gasoline, notably less pollution of the air. The almost complete combustion of LPG, or propane, results in lower exhaust fumes and less carbon monoxide than that coming from gasoline-powered vehicles. In addition to introducing less pollution into the air, better combustion causes engines to last longer and require less maintenance.

BONANZA REPORT

IT GETS BIGGER and better each year. The third presentation of the Baldwin Bonanza took place on April Fools Day preceded by an invitation-only preview the evening before that was one of those magnificent California evenings when a perfect temperature and clean, scented air provide the perfect background. With that kind of start, plus hundreds of select Arboretum plants and other assorted goodies, dedicated work by Las Voluntarias chairwomen with assists from husbands and children, and fine effort from the staff, it is no wonder that the affair netted $7,614.39. A further bonus was the signing of 91 new members. Onward to Baldwin Bonanza 1974!

MEETING WITH FASHION

The California Arboretum Foundation held its annual membership meeting on May 8th in the Demonstration Home Gardens. The program was proportioned in a way to gladden the hearts of 350 members and friends, a record attendance. Approximately fifteen minutes were given over to business, long enough for the nominating committee to appoint ten trustees for three-year terms. They are: Mr. Harrison Chandler, Mrs. Robert Cheesewright, Mrs. Peter Douglas, Mrs. John Grivich, Mr. Ernest Hetherington, Mrs. Miriam Kirk, Mr. Ralph Spencer, Judge Joseph Sprankle, Jr., Mr. Robert Strub, and Mrs. Chester Williams. Mrs. Harry Bauer and Mrs. Elizabeth Stanton were invited to serve as honorary trustees, and Mrs. Louis Winchester Jones, Jr., and Mrs. William Clayton, Jr., were appointed to the Board of Trustees for a three-year term starting July 1, 1973.

The rest of the time was taken up by tram tours of the grounds and a delightful luncheon during which guests were treated to a historical fashion show modeled by thirty-one members of Las Voluntarias. Member Carol Brayshaw gave a running account of the clothes, mostly originals dating from early rancho days to 1948, the year the Foundation was incorporated.

The meeting ended with the annual plant distribution in which this year everyone received a silver dollar eucalyptus *(E. cinerea)* and had a choice of *Nerium oleander* 'Petite Pink' or 'Petite Salmon,' or *Melaleuca elliptica.*

Peggy Dorsett in black flapper dress, c. 1926.

Jeannie Atkinson in ecru beaded-satin gown, c. 1898.

Ann Grove as Elizabeth Baldwin in white night dress, c. 1853.

Deirdre Green as Lotta Crabtree in ruby-red stage dress, c. 1869.

CHILDREN

AMONG THE near-endless number of causes in this country, or, for that matter, in the world, deserving philanthropic support, aid to children must surely rank among the top. This, in any case, is the view of the Descanso Gardens Guild, which for thirteen years now has been quietly helping a growing number of physically handicapped children from schools in La Canada, Glendale, and Pasadena enjoy each week an experience that takes them outside their circumscribed routine. Their experience is a class in gardening, usually lasting about an hour and a half, in which they learn to grow radishes and beans, daffodils and calendulas, and lots of other vegetables and flowers that introduce them to the outdoors and the world of nature.

The idea for what has become an on-

going project originated with former Guild president, Forrest Kresser Smith. Getting it going were Guild members Dorothy Deschler Fulmor, Mrs. Roger Gurley, and Mrs. Lee Milbank who today is chairman of the scholarship fund which each year selects a few older students for on-the-job training at Descanso, paying them the California minimum wage for their services. According to Mrs. Walter Weiler, Guild chairman for the handicapped children project, about 140 students are currently attending classes each week at Descanso. There are three approximately 50′ x 200′ plots for which the Guild supplies the seed, tools, and other gardening equipment needed. Together with the scholarship fund, it all adds up to a fine effort to which anyone can contribute by donating to the Descanso Garden Guild, Inc., Memorial Fund.

HISTORY VOLUNTEERS

LAS VOLUNTARIAS is today a six-year-old organization made up of 165 women donating time and energy to almost avery activity at the Arboretum. The organization began as a small group of volunteers in the historical section under the leadership of Maria Stewart, wife of former director, William Stewart. The history volunteers are not only still very much with us, they have considerably broadened their activities. Carol Brayshaw, history chairman, and Phyllis Chapman, second vice-president of Las Voluntarias, have written the following description of their work.

"What makes this arboretum different from most other arboretums is the unusually rich history of the land on which it is built. In our contemporary concept, it is the history of man and his environment, and man and his environment is the basic subject of all the school children who come here on field trips during the school year. Our history field leaders receive extensive training under the direction of Patricia Warren, staff historical curator, training that centers on the periods beginning with the Indians and continuing through rancho days to the Victorian era. During the summer, one-hour history-storytelling sessions are conducted for preschoolers, and tours of the historical section are given to the adults who bring them.

"Two of our history volunteers are engaged in a program we hope to enlarge. It currently consists of a half-hour oral story entitled 'Our Past' presented along with pictures and related objects to first graders in the classroom. This was done on the request of the San Marino Schools Talent Bank.

"Among history section projects either completed or continuing are a 45-minute slide presentation of building styles in California; a California post card collection dating back to 1908; a cross-filed photographic collection of 1,000 subjects, basically California history; a beginning oral library of taped historical or related subjects; monthly history excursions; and compilation of a research paper on 'The Canyon Arboretum.' These projects can be seen at the Depot.

"A continuing task of the history volunteers is cleaning the four historical buildings, two of them California landmarks. The Depot requires particular attention since it has become a public building receiving more than 23,000 people a year. The Depot is open Tuesdays, Wednesdays, Thursdays and Sundays and is tended by three or four docents during the morning and afternoons. Fresh flowers, arranged in a Victorian style, are regularly placed in the rooms of the Queen Anne Cottage. Adult tours and special school history tours are given by the docents when requested by the curator.

"The history volunteers organize a

variety of events relevant to history. Among them this year was the Conference of California Historical Societies, and the Arboretum Historical Fashion Show with annotations on related historical happenings. Additionally, the history volunteers contribute many hours participating in California Arboretum Foundation special events like the Baldwin Bonanza, Queen Anne Frolic, and the Hugo Reid Roundup and assist the Foundation with mailings, typing and other non-history chores just as other members have donated their time for us."

ROBERT ATKINSON

A FRIEND of the Arboretum and of home gardeners all over Southern California was lost recently with the death of Dr. Robert E. Atkinson. For 15 years a regular contributor to the Sunday Home Magazine of the Los Angeles Times, Dr. Atkinson served from 1964 to 1966 as editor of *Lasca Leaves*. His policy during this period of devoting each issue to a single subject resulted in a thorough covering of a number of horticultural topics, among them his own article on "Problems of Western Garden Soils" which appeared in the spring issue of 1965.

FIESTA

DR. ALEX L. PALANDECH, chairman of the 11th annual Fiesta de Flores sponsored by the South Coast Botanic Garden Foundation, reports that his committee is tying up loose ends in preparation for the three-day event on June 22, 23, and 24. Among the attractions that will be offered during the fiesta are a Japanese tea ceremony set in a Japanese garden, strolling musicians, and a speakers program. A standard flower show, titled "Carnival," will make up the major part of the fiesta. It will be under the sponsorship of the Costa Verde District of California Garden Clubs, Mrs. Robert Vitale, director.

BRIEFS:

IN OUR report on the anniversary banquet in our last issue, we inadvertently failed to note that two longtime Arboretum friends, Mrs. Samuel Ayres, Jr., and Mr. F. Harold Roach, were among the recipients of honorary memberships in the California Arboretum Foundation. The membership awarded to Mrs. Ayres came as a total surprise to this charming lady who is known for her quiet but strong support of her famous husband's activities in the world of plants.

At its regular meeting last March 20th, the Foundation Board of Trustees were hosts for a luncheon given in the lecture hall for staff and volunteers who were spared, if that is the word, the need to divert their attention from lunch or socializing to a single business speech.

Foundation members are invited to a 25th anniversary party, Friday evening, July 13, from 8 to 10 p.m. in the Demonstration Home Gardens. Music will be provided by the Arcadia Ramblers led by lawyer Dexter Jones, and the 19 String Band led by Arboretum assistant gardener, Bruce Dustman.

Tootie Grivich, active new member of Las Voluntarias and chairman of the Hugo Reid Roundup, an invitational affair for members set for Saturday, June 30, wants to remind everyone that this is a *morning* roundup that will take place in and around the Hugo Reid Adobe from 8 to 10 a.m., that it is for the entire family, and that breakfast will be served.

Garden groups and other organizations interested in availing themselves of an excellent, narrated, slide-program about the Arboretum, should call Adell and David Campbell, evenings only, at 885-7337.

PLANTS TO LOOK FOR

Frank Simerly

MANY plants enjoy the Mediterranean-like climate of Southern California and will be putting on their best display of color during the coming months. The queen of this period is perhaps the rose, and although all three of the department's facilities have rose gardens, the most noted is at Descanso Gardens in La Canada. The roses are at their peak beginning in June, and at that time you can still see some of the old fashioned roses that bloom only in the spring and early summer. The old fashioned rose garden at Descanso features plants that were mentioned as early as 1500 B.C. in literature and you can walk around the garden and see the development of the rose up to about 1940. The modern roses bloom throughout the warm months of the year and will still be in flower as late as Thanksgiving time. Beginning in 1939, the A.A.R.S. (All American Rose Selections) were started. Since that time many roses have received this much sought-after award. Winners of the 1973 awards can be viewed now at Descanso Gardens and their names will be published soon.

Summer annual bedding plants will also be of interest at Descanso. Marigold hybrids like 'First Lady,' which is bright gold and yellow, and 'Cracked Jack,' which is orange and ochre, and the dwarf 'Bolero' will all be in color as well as *Catharanthus roseus,* the cockscomb or celosias, cosmos, and the colorful *Amaranthus splendens.* In the shade, look for the powder blue ageratum, the more colorful red begonias, and the richly hued impatiens.

The Arboretum will also feature large expanses of colorful annual flowers, but be sure to see the many unique trees that will be in bloom during the summer months. One of the better known trees to be found is *Albizia julibrissin.* It can be seen at each of our gardens; at the Arboretum it is located adjacent to the ground cover demonstration plots. The common name for it is 'Silk Tree.' It has rich pink, powder-puff-like flowers born among lacy fern-like leaves, and because of its broad, low, crown it is frequently used as a shade tree in patio areas. It is a deciduous tree. A more unusual tree to be found at the Arboretum is *Angophora subvelutina.* It is a relative of the eucalyptus and has small white flowers in such great quantities it looks as if it were covered with snow. It is a tall, slender, evergreen tree, with eucalyptus-like foliage, and because of its neat habit and probable usefulness as a street tree it will be introduced within the next year. Another tree that is gaining popularity rapidly is *Cassia leptophylla.* There are handsome specimens on the south side of the Arboretum Administration Building, and on Tallac Knoll adjacent to the waterfall, and they are also planted at our South Coast garden. This handsome tree is covered with large clusters of golden-yellow flowers that individually are as large as a quarter. It's not hard to see why this plant received the common name of 'Gold Medallion Tree.' Brachy-

Albizzia julibrissin

Photo by William Aplin

chiton trees will also be in flower during this period. In particular, look for *Brachychiton acerifolium,* the 'Flame Tree' and *Brachychiton bidwillii.* These are handsome evergreens from Australia, and as the names imply, their flowers are showy and red. Showy trees that most people are familiar with are the *Jacaranda acutifolia.* These are budding now and it appears that they maybe going to have one of the best flowering seasons in many years. Many people have not seen the white flowering jacaranda which the Arboretum introduced in 1961. There is a handsome specimen of this tree on the south side of the gatehouse entrance to the Arboretum. Other Arboretum trees to be in flower during this period include *Dais cotinifolia, Bauhinia* species, *Lagerstroemia* species, *Erythrina* species, *Magnolia grandiflora,* and many *Eucalyptus* species.

Many flowering shrubs and ground covers can also be viewed. Shrubs from the Australian Section seem to be the most dominant with callistemon leading the list. Many people are familiar with the common bottlebrush, *Callistemon citrinus,* but there are many other species to be seen at the Arboretum including *Callistemon lilacinus, C. linearis, C. rigidus,* and one that is to be introduced next year, *C. pachyphyllus viridis.* It has foliage very similar to the common bottlebrush, but the flowers are large and a lime color. Closely related to the callistemon are the calothamnus, and there are many species of them to be seen at the Arboretum including *Calothamnus validus* which was introduced by the Arboretum in 1964. Young plants of this shrub can be seen east of the Peacock Pavilion and a more mature specimen can be seen just west of the nursery complex.

Another Arboretum introduction that should be noted at this time is *Hibiscus huegelii,* which was made available to the nurseries in 1968. *Nerium oleander* will be flowering, and be sure to see the new dwarf varieties, 'Petite Pink' and 'Petite Salmon' that the Arboretum introduced this year. The oldest plantings of the

Angophora subvelutina

Photo by William Aplin

dwarf oleander may be seen next to the Hugo Reid Adobe. The newly-developed garden that will give ideas to townhouse and garden apartment owners is located in the Demonstration Home Gardens. It is the place to get a preview of some of the agapanthus that have been developed at the Arboretum. There are many dark, nearly purple selections that are very attractive.

South Coast Botanic Gardens will also feature *Nerium oleander* varieties, *Agapanthus africanus* selections, and you will be able to see there large areas devoted to ground cover plants, many of which were introduced by the department. *Osteospermum fruticosum* is the best known of the ground cover plantings. Another ground cover that was introduced by the Department in 1963 is *Arctotheca calendula* which comes from South Africa as does osteospermum. It has a yellow daisy flower with a gray-green foliage that hugs the ground. Arctotheca is a little tender but will come back rapidly after frost and will withstand temperatures down to 27 degrees. It is also featured along the stream at South Coast and in a massive planting at the Arboretum adjacent to the orchid houses and north of the jungle area. South Coast Botanic Garden has many plantings of gazania hybrids and these will be in flower off and on throughout the summer months. The Department has introduced two *Gazania rigens* hybrids and plantings of them can be seen just east of the Begonia House and throughout the juniper collection. They are shown on the cover of this issue and described on page 87.

It is apparent that some of the flowers of interest can be seen at each of our gardens, nevertheless you should visit each garden because the plants are used in different situations and because varied climatic conditions will often result in different growth reactions. Try to visit all of our gardens soon and see if you can find some of the plants we have suggested you look for.

A POPULAR GROUND COVER

George H. Spalding

HAVE YOU ever tried botanizing from an automobile window going 65 miles per hour down the freeway? It's not easy. There is one plant however, that can be identified with ease under these circumstances. Whenever you see large areas covered with white, lavender or purple flowers on plants that hug the ground, or are under two feet in height, there can be little doubt that is is *Osteospermum fruticosum* or one of its hybrids. Planted by the hundreds of thousands, these trailing daisies from South Africa are rapidly changing many of the raw cuts and embankments along our freeways into spectacular displays of bloom which last for several months during the winter and spring.

Osteospermum is a genus of South African plants belonging to the Compositae or Daisy family. There are about 65 species, half of which are found only in the region of the Cape Peninsula. The name *Osteospermum* means hard and bony. One or two species had been described in the 1700s under different names, but it was Linnaeus, the father of modern botany, who gave the name *Osteospermum* to the genus when he published his historic work Genera Plantarum in 1737. Some of the species were placed in the genus Dimorphotheca at one time and many of the early references to *Osteospermum ecklonis* and *Osteospermum fruticosum,* for example, will be found under that genus.

The species of *Osteospermum* may be annuls or shrubby perennials. Most have golden or orange daisy flowers, but a few have white or mauve ones. It is interesting to note that the two species most commonly grown in Southern California are white flowered and the exception to the rule so far as flower color is concerned. These are *Osteospermum ecklonis,* 2 to 3 feet in height with white flowers which have a blue center, and *Osteospermum fruticosum,* which seldom gets more than 4 to 6 inches high with white or lavender flowers and a lavender or purple center.

In 1958 the Arboretum introduced *Osteospermum fruticosum,* which was known for many years as *Dimorphotheca fruticosum,* and made it available to nurseries. This plant had a prostrate habit of growth with lavender flowers.

Some years ago, in a large planting of *Osteospermum fruticosum,* there appeared a more upright form with large, white flowers which had a blue center. This was named Snow White. A few years later, in a planting of Snow White, there appeared a deep purple form with a mounding habit in the earlier stages of growth, spreading out as the plant matured. This was named Burgundy Mound and introduced into the nursery trade in 1969. The variety African Queen, which is also available in nurseries, is quite similar to Burgundy Mound in color but does not have the early mounding habit.

All of the named varieties are probably hybrids between *Osteospermum fruticosum* and *Osteospermum ecklonis* as their habit of growth and seed are intermediate between these two species.

Osteospermum fruticosum and all of the hybrids are being planted by the thousands on home grounds and in parks for the splashes of color they produce from November through April. Another use for these plants, which has not been fully developed, is their use in containers,

White and purple *Osteospermum fruticosum*

Photo by William Aplin

especially hanging baskets. It would seem this use has many possibilities for interesting treatments. A mass of any of the species or varieties cascading over a wall is a sight to remember. They are also particularly effective on moderate slopes where the full impact of the flower display can be seen. This wide use has been possible because of the ease with which the plants are propagated by cuttings, and the ease of culture. The literature says that they grow best in an open, sunny position in light soil. This is undoubtedly true, but along our many miles of freeway, the soil is often far from light with very little organic content, yet *Osteospermum* appears to be thriving. I say it appears to be thriving because the oldest plantings are only two years old and that is not sufficient time to make a reliable appraisal.

Today, *Osteospermum fruticosum* and its hybrids are readily available. Their value as fast-growing ground covers, and their ease of culture, have created such a demand that all of the major wholesale growers of this type of material grow them. As mentioned earlier these plants will grow in a wide variety of soils. The one thing to watch out for is overwatering. While osteospermums need an adequate supply of moisture, they will rot and become subject to fungus attack if the planting is kept constantly wet. This is particularly true of older plantings where there has been some build-up of stems and old leaves. The recommended planting distance for plants from flats is 18 to 24 inches apart. It is best to plant in staggered rows. When planted 18 inches apart, 100 plants will cover 225 square feet, and at 24 inches apart, 100 plants will cover 400 square feet.

George Spalding is a horticulturist with an intimate knowledge of the ornamental plants that grow in Southern California. During his 25 years on the Arboretum staff he has written numerous articles for this magazine.

CARNIVOROUS PLANTS

Katsuhiko Kondo

The term "insectivorous plants" was introduced by Charles Darwin in 1875 in his famous text by that name. In 1942 F. E. Lloyd called these plants carnivorous plants, since insectivorous plants digest not only insects but also small animals, like fishes, birds, and mice. Carnivorous plants are always included among those higher vascular plants which produce their own foods by photosynthesis and have trapping and digesting mechanisms. Carnivorous fungi have trapping and digesting mechanisms but lack a photosynthetic machine and are, therefore, excluded from the carnivorous plants. Some higher vascular plants which have a trapping apparatus but do not have digesting mechanisms (e.g., *Roridula, Triphyophyllum*) also are excluded from the carnivorous plants. The identifying aspects of carnivorous plants, then, are their trapping apparatus, and their digesting mechanisms which always include enzyme activities. Carnivorous plants have an enzyme system that digests small animals in a strongly acid medium which does not allow putrefaction. Thus, they can use organic nitrogen from the small animals directly as a nutrient. It seems that since these plants can obtain organic nitrogen in this way and use it directly and economically as a nutrient, they are well adapted to regions with barren soils.

Table 1 shows Lloyd's names for all kinds of traps exhibited by the carnivorous plants.

Table 1. Traps of carnivorous plants named for their obvious analogs among human devices (after Lloyd, 1942)

Kind of trap	Genus	Common Name
Pitfalls (passive traps) the pitcher plants	**Heliamphora**	South American pitcher plant
	Sarracenia	pitcher plant
	Chrysamphora	cobra plant
	Cephalotus	Western Australian pitcher plant
	Nepenthes	Asiatic tropical pitcher plant (monkey cup)
Lobster pot (passive trap)	**Genlisea**	
Bird lime or fly-paper trap		
Passive	**Byblis**	rainbow plant
	Drosophyllum	
Active	**Pinguicula**	butterwort
	Drosera	sundew
Steel-trap (active)	**Dionaea**	Venus' fly trap
	Aldrovanda	waterwheel plant
Mousetrap	**Utricularia**	bladderwort

Pitfalls do not show any active movement. Their trapping mechanisms are highly specialized structures. Most all pitcher plants have pitfalls (e.g., *Nepenthes, Sarracenia*) which produce nectar from glands located around their mouths or lids. Insects or small animals take

nectar produced by the glands and move around the traps or entrances, sometimes losing their balance and slipping into the pitchers. *Sarracenia, Heliamphora, Chrysamphora,* and *Cephalotus* have well-developed downward-pointing hairs. It is very easy for prey to slip on the hairs and be forced downward toward the bottom of the pitchers.

The pitcher of *Chrysamphora* is very unusual. The tube is tapering, widening upward. At the top the tube spreads suddenly, and at the same time is bent sharply forward to form a dome, bringing the mouth into a horizontal position underneath. Small animals crawl around the mouth of the pitcher and enter inside, then they fly or go to the top of the interior of the pitcher because of translucent areas there. Finally the prey lose their way in trying to get out and fall downward into the liquid within the pitcher and die. *Nepenthes* (Figs. 3 to 7) has a little different mechanism: the pitchers do not have any downward-pointing hairs but instead have colorful, slippery mouths around the entrance. It is believed that the pitcher of the pitcher plants arises by fusion of the leaf margin. The liquid in the pitcher has a high specific gravity and is sticky thus making it doubly difficult for the victims to get out of the pitcher. Five or ten minutes after their careless mistake, they are often dead.

The lobster pot found in *Genlisea* is another passive trap which basically has the same mechanism as the pitcher plants. The trap is Y-shaped. Structurally this consists of an epidermis enclosing a very extensive intercellular air space of lysigenous origin. During elongation, each arm of the Y-shaped part of the trap becomes twisted as a result of rotatory growth: one on the right, clockwise, the other part counterclockwise. The funnel-shaped entrances are formed by the occurrence at certain distances of two large clear cells which lie one upon the other, and which may be called prop cells. They are merely the end cells of the rows of trapping hairs. There is a row of prop cells on only one edge, and the prop cell is only the middle cell of a three-celled hypertrophied trichome, the basal cell of which is much enlarged, while above it the middle cell is enormously large and ends in a small knob-shaped cell terminating the trichome. The Y-shaped part of the trap is connected with a tubular neck which makes the bulb look like a chianti flask. This bulb is the final part of the trap in *Genlisea.* Many digestive glands are located in this area. Small animals enter the mouth of the trap, and are led toward the inside of the tube by prop cells and trapping hairs. They finally reach the bulb part of the trap where with bacterial help they are killed and digested by enzymes from the digestive glands of *Genlisea.*

Bird limes or flypaper traps of carnivorous plants are of two types: the passive and the active trap. *Byblis* (Fig. 13 and 14) and *Drosophyllum* are the examples of plants with passive flypaper traps. Many glandular hairs and sessile glands are found on the leaves of these genera and they produce a sticky, acid liquid containing an enzyme. But the glandular hairs and the leaves do not show any movement in catching small animals. This explains why these structures are called passive traps or flypaper traps. Small animals are caught by the sticky liquid produced by glands on these leaves (flypaper traps) and then the prey die in the same position and are digested by a certain digestive enzyme. In contrast, *Drosera* and *Pinguicula* have active glandular hairs and leaves which move, twist, hold, fold and roll victims to the center of the leaves. Thus, these are called active types of flypaper traps. The glandular hairs consist of a tapering stalk topped by an oval gland. The stalk

Fig. 3-8. Examples of pitfalls:

Fig. 3. *Nepenthes veitchii*

Fig. 4. *Nepenthes* x *hookeriana* (albino type)

Fig. 5. *Nepenthes* x *trichocarpa*

Fig. 6. *Nepenthes* x *hookeriana* (wild type)

Fig. 7. *Nepenthes gracilis*

Fig. 8. *Heliamphora nutans*

Fig. 9-11. Examples of active flypaper trap:

Fig. 9. *Drosera menziesii*

Fig. 10. *Drosera drummondii*

Fig. 11. *Drosera stolonifera*

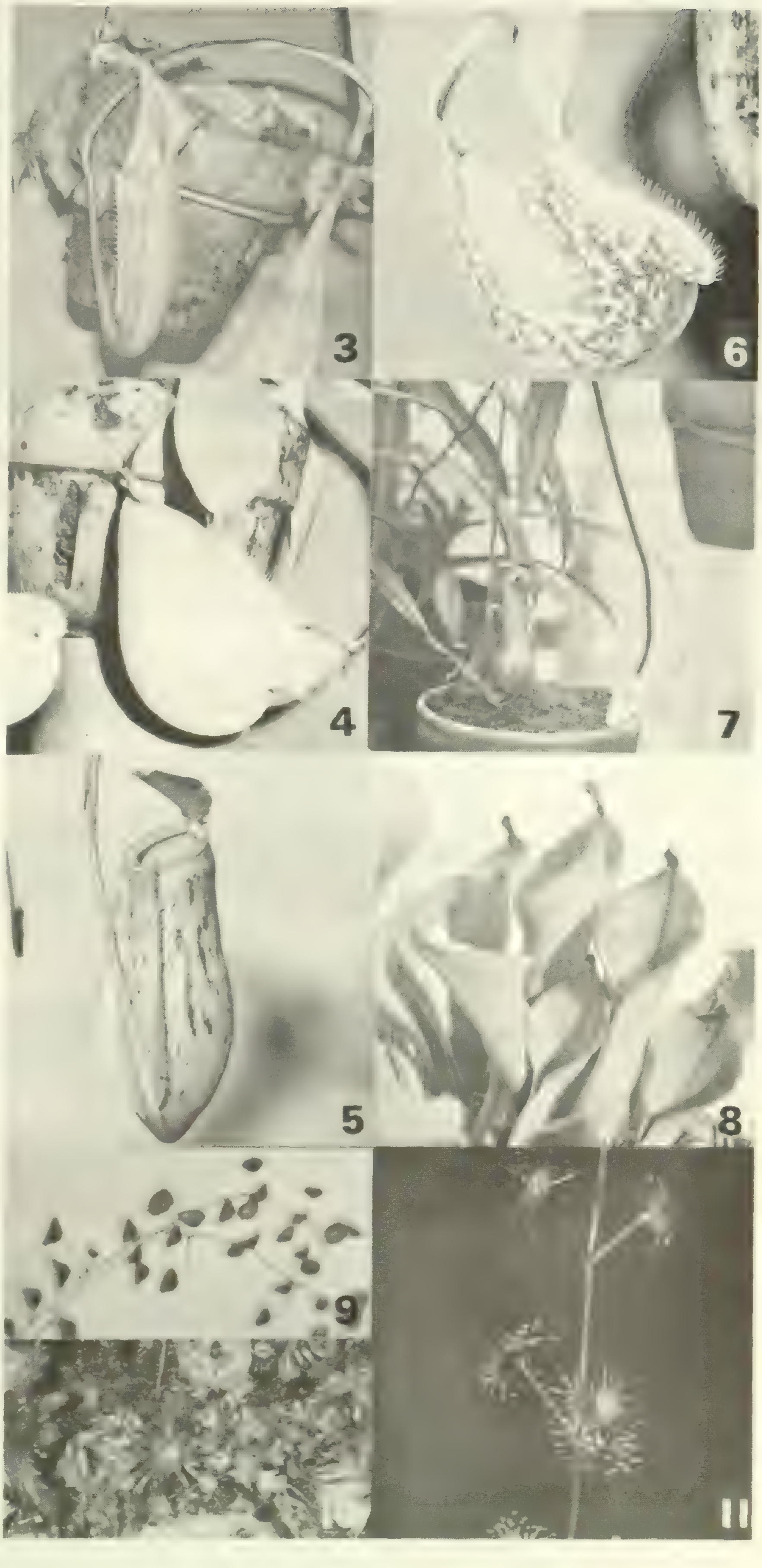

Fig. 12. Digestive glands of *Aldrovanda vesiculosa*

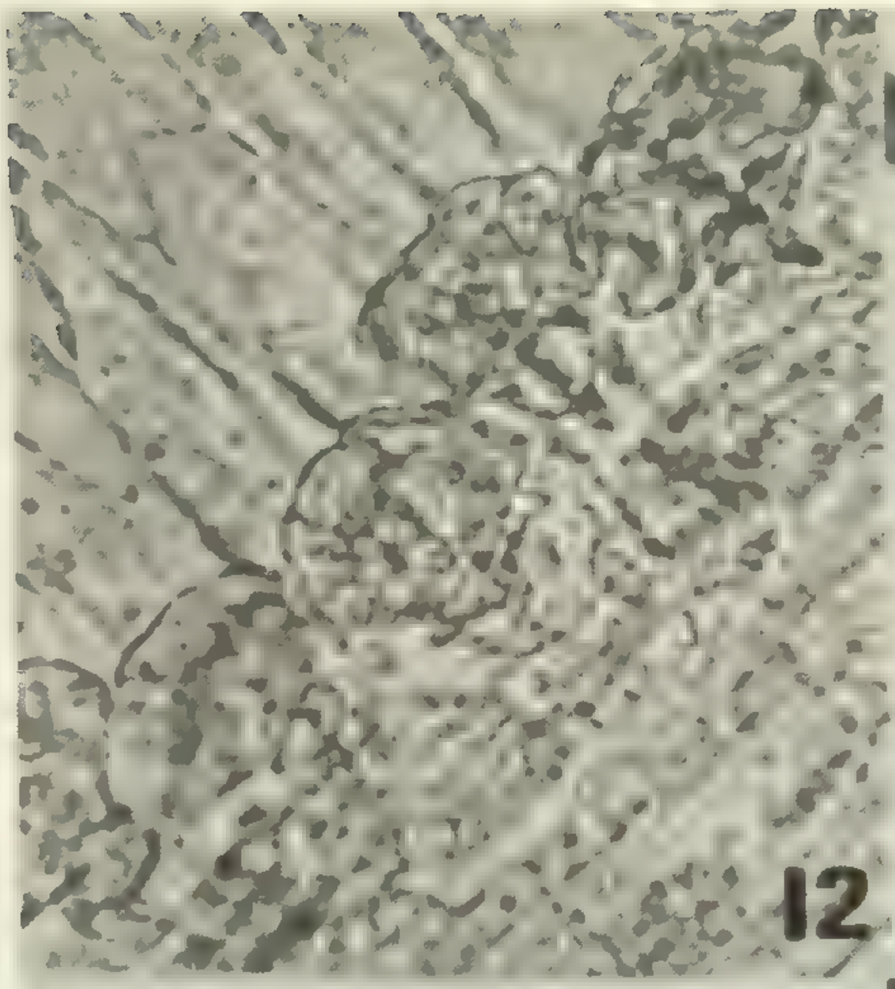

Fig. 13-15. Examples of passive fly paper trap

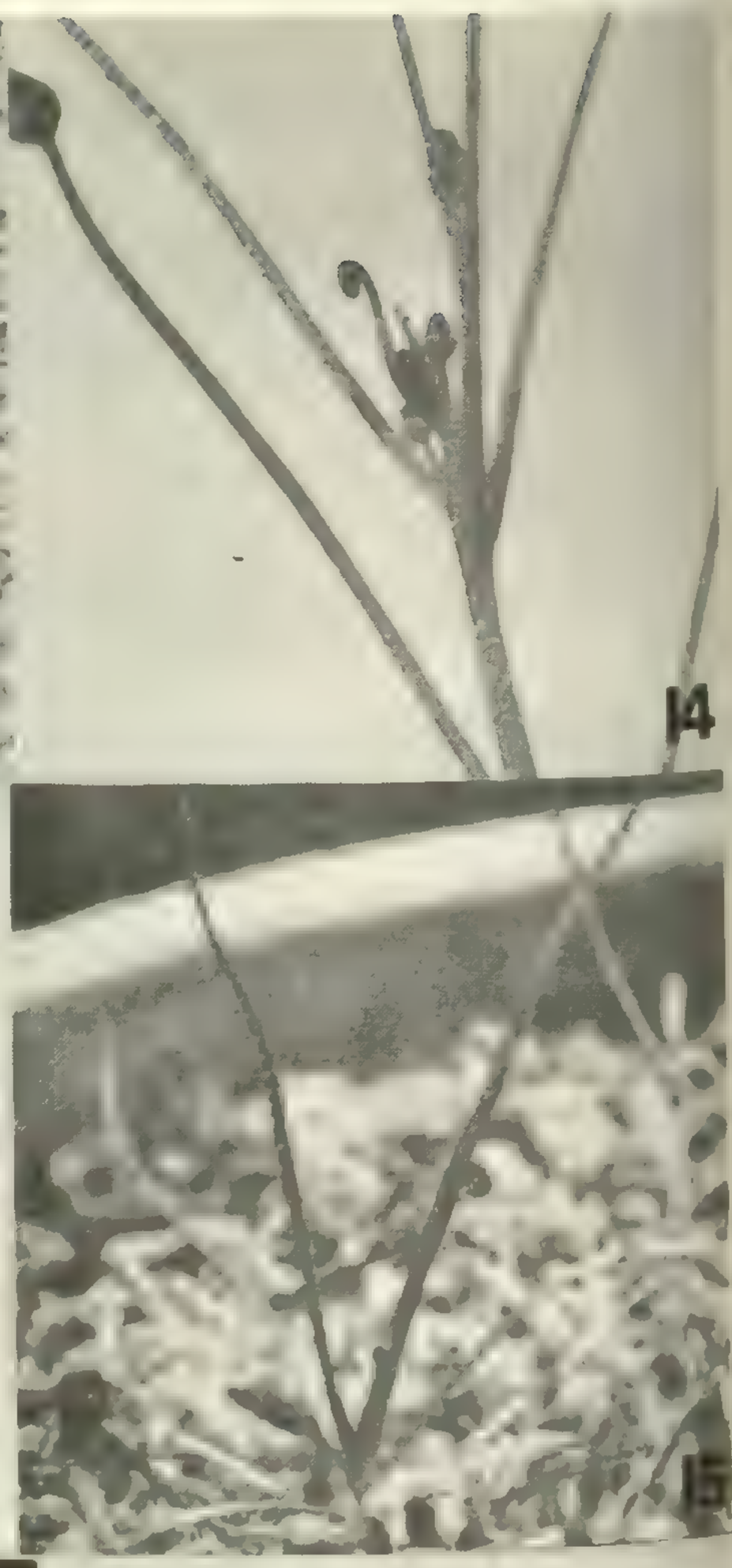

Fig. 13. *Byblis liniflora*

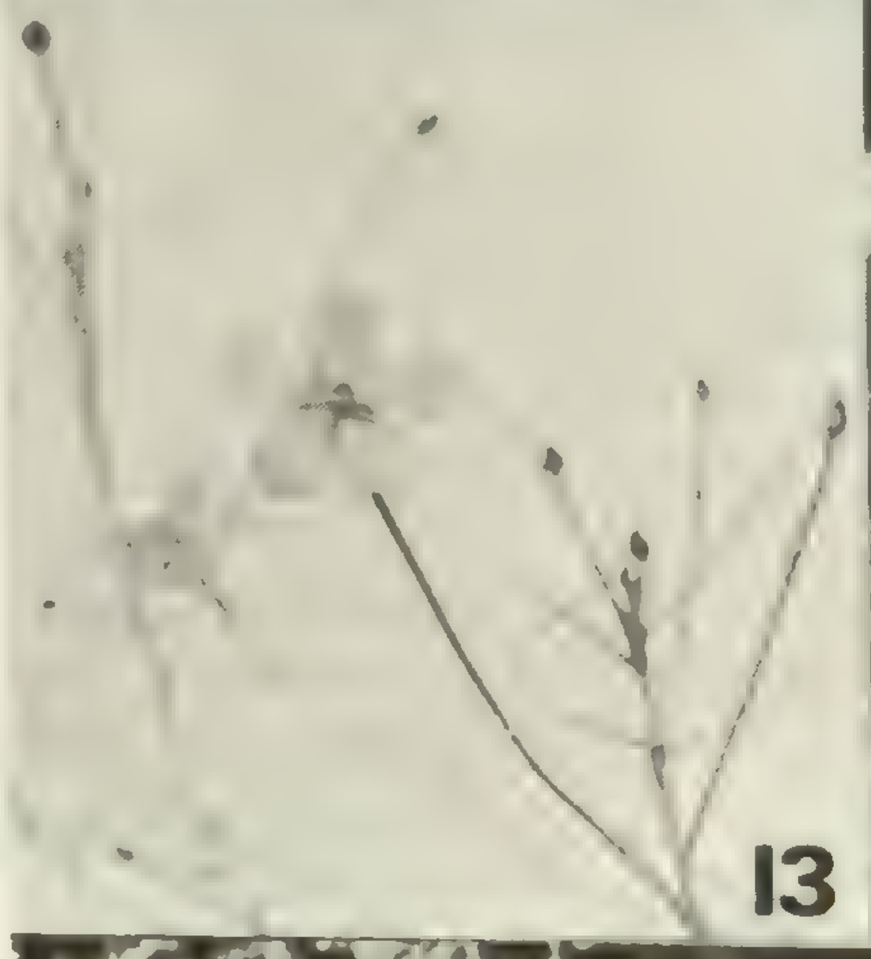

Fig. 14. Shoot apex of *Byblis liniflora*

Fig. 15. *Drosophyllum lusitanicum*

Fig. 16-19. Active fly paper trap—*Pinguicula*:

Fig. 16. Vegetative parts of *Pinguicula* (*P. lusitanica*)

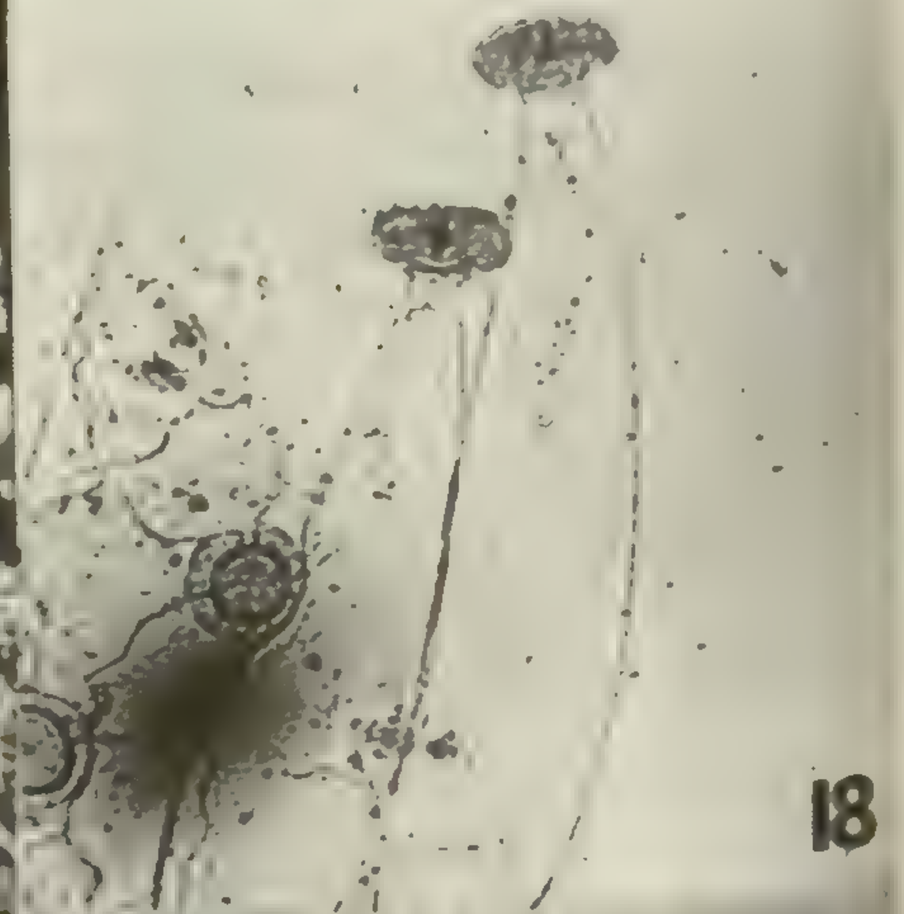

Fig. 17. Flower of *P. colimensis*

Fig. 18 and 19. Glandular hairs of leaf

Examples of mousetrap (*utricularia*): Fig. 20, *U. caerulea;* Fig. 21, *U. menziesii;* Fig. 22, *U. multifida.*

arises from the leaf surface as a mass of tissue including all elements of the leaf structure — epidermis, parenchyma, and vascular tissue. Many leaves roll back on themselves from the apex toward the base. The glandular hairs are capable of movement, often being bent like a bow, a very useful movement for catching small animals. In addition to the stalked glands, there are very numerous, small, sessile glands. The origin of the sessile glands is purely epidermal. Sessile glands of the concave leaf surface are alone capable of absorption; it should be noted that those of the dorsal surface are small and usually have lost their terminal cells. The active glands display cytoplasmic changes during the absorption of nutrients. If small animals are caught around on the edge of a leaf blade, long, marginal, glandular hairs start bending and carry the prey slowly to the center of the blade. Then, the leaf slowly folds and rolls the apex toward the base. The advantage of this behavior is that the entire surface of a victim is covered and digested by enzymes from glandular hairs and sessile glands.

The steel-trap type is found in *Aldrovanda* and *Dionaea.* This trap is very active, and is the outer part of the leaf (the blade), which consists of two lobes, trapezoidal in form with fringed margins and united along the middle line by a thick midrib. The two lobes act like the jaws of a steel trap. The two lobes form an angle of 40 to 50 degrees when they are widely open. They are clothed with a distinctly firm epidermis of straight-walled cells, elongated and parallel with the veins, but become somewhat wavy toward the margins, which lends a surprising stiffness to the trap. The inner surface of each lobe in *Dionaea* is supplied with many glands and each has three trigger hairs which exhibit sensitive cells at the base. There are two physiological kinds of glands, digestive and alluring. The alluring glands are situated in a narrow zone just within the fringed margin and secrete a sweet liquor. The digestive glands are rendered conspicuous by their deep red color and are responsible for the evident red color of the inner surface of the trap. In contrast, the alluring glands contain no pigment. However, small animals seem to be attracted by the honey or sweet liquor produced by the alluring glands, and in moving around must touch the sensitive trigger hairs at least twice to *"spring the trap."* The most interesting feature of this steel-trap mechanism is the method by which water moves during the closing responses of the leaf-lobes. The movement of the lobes seems to be due to the loss of water through pores in the protoplasm. Indeed, there appears to be rows

of extremely minute pores of globules in the protoplasm of the parenchyma cells of the motile tissues. The mechanism is similar to that in the pulvini of the sensitive plant, *Mimosa,* in which the leaves and leaflets fold together due to a rapid loss of turgor in the cells of the pulvini. There are two steps in the closing of the trap which may be referred to as *"shutting"* and *"harrowing."* The first makes the initial catch of the prey, and the second more tightly clasps the victims, preventing their escape and forcing them into contact with the digestive glands (Fig. 12) near the center of the trap.

The last to be described is the mouse trap which is found in *Utricularia,* an aquatic genus. The trap is called a bladder, which it resembles in shape. The entrance is guarded by two valves, a larger, the door, and a smaller membranous one, the velum. The door is attached to the trap along a semicircular line on the dorsal part of the entrance, its free edge hanging and in contact with a firm, semicircular collar or threshold. Against these are numerous longer or shorter, stalked mucilage glands, secreting mucilage and sugar, which are said to be attractive to small animals and so act as a lure. The door bears four stiff, tapering bristles attached near the free, lower edge. These comprise the tripping mechanism. The surface of the threshold, against which the door edge rests, is covered with a pavement epithelium of glandular, sessile cells secreting mucilage. Along the outer edge of this pavement there is attached a thin but firm transparent membrane, the velum, which lies against the lower edge of the door, filling in the chink between this and the threshold. The internal surface of the trap has many glandular hairs, called bifids and quadrifids. In response to small animals touching hairs on the door, the door opens. Since the pressure inside the bladder is lower than that outside, by inward movement of water small animals are forced in to the bladder. Then the door closes. The prey are killed and decomposed with bacterial help in the bladder. Glandular hairs in the bladder produce enzymes which assist in the digestion of the animals. The soluble nitrogenous compounds are then absorbed into the plant.

I wish to discuss further the digestive enzymes produced by carnivorous plants. Formerly, the protease in carnivorous plants had been suspected to be pepsin-like, since it acts within essentially the same pH range as does pepsin. The present studies show the acid protease which carnivorous plants have is different from pepsin. The acid protease, named *nepenthesin* (Nakayama, *et al.,* 1968), is the common digestive enzyme in carnivorous plants. *Nepenthesin* is predominantly specific to aspartic acid residue at its carboxyl side or at its amino side, and is apparently specific also to tyrosine and alanine residues at their carboxyl side. The protease seems to be an endopeptidase. The mechanism of digestion involves cooperation between protease and some other enzyme, such as a chitinolytic enzyme or chitinase (Amagase, *et al.,* 1969, 1972).

It is still unknown how foods are absorbed through the cytoplasmic membranes in the glands of carnivorous plants after enzyme activity. Changes in the nitrogen content, or nitrogen movement in the leaves given protein have been observed by various methods (e.g., Sibata, *et al.,* 1972; Heslop-Harrison, *et al.,* 1971). Especially the work of Heslop-Harrison, *et. al.,* (1971) is very interesting. After placing 14C-labelled protein on the glands of a leaf of *Pinguicula,* digestion on the leaf surface and absorption of the products has been investigated autoradiographically. Within two hours, digestion products enter the leaf and move towards the margin in the vascular

system. Within twelve hours movement out of the leaf begins. Thus, carnivorous plants in some ways seem to have similar digestive mechanisms as those in animal stomachs.

At least 450 species of carnivorous plants representing thirteen genera and six families are taxonomically known. All genera are shown in Table 1. Each family and each genus belonging to it are discussed below:

1. Family Droseraceae (Sundew family)

The family consists of the genera: *Drosera, Drosophyllum, Dionaea,* and *Aldrovanda.*

A). *Drosera.* Drosera consists of approximately ninety species in the world: about sixty species grow in Australia. The name "Drosera" was originated from a Greek word "droseros," which means moist with dew. Thus, the common name in English for *Drosera* is "sundew." They grow mostly in moist pinelands and sandy roadside ditches in savannahs. They thrive in acid soil (pH 3.5 to 4.0) and in air and soils with a high humidity. Figs. 9 to 11 show some examples of *Drosera.*

B). *Drosophyllum.* The name "Drosophyllum" is a compound word of "drosos" (dew) and "phyllon (leaf). However, *Drosophyllum* means leaf with dew. This genus is monotypic: the single species *Drosophyllum lusitanicum* (Fig. 15) is found only in Portugal, Spain, and Morocco.

C). *Dionaea.* The name "Dionaea" comes from the Greek word "Dione," which means Venus. The common name in English for *Dionaea* is "Venus' flytrap." This genus is monotypic and a very rare endemic: the species *Dionaea muscipula* is found only in North and South Carolina in the United States. The North Carolina state government protects this interesting plant by law.

D). *Aldrovanda. Aldrovanda* was named in honor of N. Aldrovandi, an Italian botanist. *Aldrovanda* is another monotypic genus and is distributed from Japan, Australia, through India, to Eastern Europe. It is a floating, aquatic plant.

2. Family Sarraceniaceae (Pitcher plant family)

The family consists of *Chrysamphora, Heliamphora,* and *Sarracenia.*

A). *Chrysamphora.* The name "Chrysamphora" is a compound word of "chrysos" (golden) and "amphora" (bottle). Because of its leaf shape, this plant is locally called "cobra plant." This genus is monotypic and endemic to the Siskiyou Mountains of Oregon and California.

B). *Heliamphora.* The name "Heliamphora" is a compound word in Greek of "helos" (sun) and "amphora" (bottle). This genus, which is the most primitive type in the Sarraceniacaea, consists of six species all endemic to the mountains in Venezuela and Guiana of South America. Fig. 8 shows a species of *Heliamphora, H. nutans.*

C). *Sarracenia.* Sarracenia is based on Tournefort's original description (1700) of a plant sent to him by M. S. Sarrazin in Canada. *Sarracenia* was named in honor of M. S. Sarrazin, however, and it was later adopted by C. Linnaeus (1737). *Sarracenia* consists of eight species: *S. oreophyla, S. sledgei, S. flava, S. drummondii, S. rubra, S. minor, S. psittacina,* and *S. purpurea.* Natural hybrids in the genus are very common. They are distributed in the eastern United States and Canada.

3. Family Nepenthaceae (Tropical pitcher plant family)

The Nepenthaceae consists of only one genus *Nepenthes.*

A). *Nepenthes.* Nepenthes is a compound word in Greek of "ne" (no) and "penthos" (grief). This genus is found scattered throughout the tropics of the Old World from the Philippines as far south as northern Australia and New

Caledonia, and westward to Madagascar and Seychelles. They grow only in moist situations in lateritic acid soil. Figs. 3 to 7 show some examples of *Nepenthes.*

4. Family Byblidaceae (Rainbow plant family)

The Byblidaceae consists of only one genus, *Byblis.*

A). *Byblis. Byblis,* which is endemic to Western Australia, consists of two species: *B. gigantea* and *B. liniflora* (Figs. 13 and 14).

5. Family Caphalotaceae (Western Australian pitcher plant family)

The Cephalotaceae consists of only one genus, *Cephalotus,* which is monotypic and endemic to Western Australia.

6. Family Lentibulariaceae (Bladderwort family)

The Lentibulariaceae consists of three genera, *Pinguicula, Genlisea,* and *Utricularia.*

A). *Pinguicula. Pinguicula* comes from the Latin word "pinguis," which means grease. Its common name is "butterwort." *Pinguicula* consists of 46 species scattered around the world. *Pinguicula* grows in wet places often with mosses; in chinks of wet, dripping rocks; on hummocks in swamps; on wet sand, and on other wet substrates.

Figs. 16 and 17 show some examples of *Pinguicula.*

B.) *Genlisea.* Genlisea consists of about 20 species growing in western Africa, and in Brazil and Guiana in South America.

C). *Utricularia.* The name "Utricularia" originally came from "utriculus" which in Latin means "bladder." Thus, the common name for *Utricularia* is bladderwort. *Utricularia* is found as a free-floating or anchored aquatic, or an epiphyte among mosses, or a terrestrial plant on moist to wet sandy soils. The genus consists of approximately 310 species in many parts of the world. Figs. 20 to 22 shows some examples of *Utricularia.*

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Katsuhiko Kondo is a Ph.D. candidate in the Department of Botany at the University of North Carolina. His special interests are carnivorous plants and Camellia, with particular reference to speciation and hybridization. Mr. Kondo is the author of the book, "Carnivorous Plants," published by Bunken Publishing Company, Osaka, in 1972.

Field of *Gladiolus tristis* at Los Angeles State and County Arboretum.

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TRAVELER IN A VANISHED LANDSCAPE The Life & Times of David Douglas, Botanical Explorer, by William Morwood, Carkson N. Potter, Inc./Publisher, New York, 1973; 221 pages; line drawings and maps; $7.95.

This biography of the horticulturally trained Scot who changed the landscaping habits of Europe by gathering seed of California annuals — which became the "carpet bedding" of English gardens — is a highly entertaining adventure story. The prologue and epilogue could stand alone as one of Morwood's *New Yorker* short stories, concerned as they are with the violence and mystery of Douglas's death, which might have been murder, suicide, or a simple accident resulting from the naturalist's curiosity about a cattle trap in Hawaii.

Although necessarily somewhat superficial, a vast amount of geography and history are covered, and the formidable bibliography attests to the research. Morwood's vivid reporting (with occasional surmising) brings alive the world of the elite (later "Royal") Horticultural Society, the vigor of New York and Philadelphia, the brashness of Hudson's Bay Company beaver trappers in the Northwest, Monterey society and the hide trade, and Protestant missionaries in Hawaii. Douglas' 35-year life (1799-1834) spanned a rare historical period.

Psychological and social insights into the personalities of great scientists and their capacity for selfish as well as heroic deeds, are the author's keen contribution, validated by Douglas' contacts with men who prepared him for his journeys or whom he met during his work. This stubborn Scot's poor education made him ill-at-ease among upper-class Londoners of the Horticultural Society. Worse, he was scientifically unprepared to perform the taxonomic work of classifying his own collections. The discoverer and namer of the Sugar Pine (Pinus lambertiana) believed he had found 340 new species among the 500 or so he collected in California. Botanists credit him with 68. He was jealous of his personal journal, wanting to rewrite it himself for publication; being unable, he refused help and stashed it away. It was not found and finally published until 1914.

But his contributions were considerable. The author puts it succinctly: "His dedication to botany was as a practical explorer, a field specialist who sought out and brought back for study and cultivation plants never known before in Europe. In this work he was supremely successful." He collected more than 2000 ferns in Hawaii for Sir William Hooker, the first director of Kew Gardens.

The vanished landscape of the title is of concern to ecologists. The Columbia River area which the twenty-five-year-old David Douglas was sent to explore no longer exists, much of it being under water behind huge dams. It was from here that Douglas brought back seeds of a great fir that was to receive his name. Notes of early explorers are incomplete because there was so much new to them and they assumed the rest would remain. In California the original grasslands were not described in detail. It is only recent brilliant botanical detective work on some of the first adobe bricks which shows how many annual and perennial clovers as well as bunch-grasses were displaced by the vigorous alien oat *(Avena fatua)* which thrived on the resultant nitrogen-rich soil.

No credits are given for fine black and white drawings, but some of the helpful maps are signed "Palacios."

This book is a happy contribution to general literature, as there is almost nothing in print about this stalwart individual for whom more plants have been named than any other person in the history of botany.

— Nancy Ryan Zabriskie

RECENT ACQUISITIONS TO LASCA LIBRARY

MANUAL FLORA OF MADEIRA, Richard Thomas Lowe, John van Voorst, London 1868, 731 pp.

USEFUL NATIVE PLANTS OF AUSTRALIA, Joseph Henry Maiden, Turner & Co., London, Turner & Henderson, Sydney, 1889, 696 pp.

Gazania rigens (Cover)

Gazania rigens hybrid 'Sun Gold' and 'Sun Burst' are new introductions from the Department of Arboreta & Botanic Gardens. They have many fine attributes that lead us to believe they will be one of the more popular ground cover plants in the near future.

Both cultivars have gray foliage. 'Sun Burst' is a deep orange color in the center, shading to a lighter orange at the edges. 'Sun Gold' is a deep buttery-yellow in the center with a lighter yellow at the tips of the petals.

Both have flowers that measure just under two inches in diameter. The plants spread well making an excellent ground cover yet are restrained enough so that they are easy to keep out of areas where they are unwanted. They have a long blooming period which begins in the spring and continues throughout the warm months of the year with the heaviest bloom being for about an eight week period in the spring.

They have all of the good points of *Gazania uniflora leucoleana* and none of the bad points. They bloom better, grow with more restraint, and seem to be more disease resistant.

There are large plantings at the Arboretum that have been in place for two years, and none of them show the deterioration that is often noted in gazania plantings and that is generally caused by one of many soil funguses. Gazania 'Sun Burst' and 'Sun Gold' are excellent ground cover plants, can be useful in borders, and may even be grown in containers successfully.

TEMALPAKH-CAHUILLA INDIAN KNOWLEDGE AND USAGE OF PLANTS, Lowell J. Bean and Katherine S. Saubel, Malki Museum Press, Banning, Calif., 1972, 225 pp., black and white photographs.

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6 HORSES AND 10 HEAD, Jane D. McCloskey, Boys' Club of Pasadena, Calif., 1971, 136 pp., black and white photographs.

THE FLORA OF KARACHI, S. M. H. Jafri, Book Corp., Pakistan, 1966, 375 pp., black and white drawings.

FLOWERS OF THE BAHAMAS, Hans Hannau & Jeanne Garrard, Hastings House, New York, 64 pp., color photographs.

ARBORETUM WEATHER

Long. 34°08'48" N.
Lat. 118°2'59" W.
Elev. 571.28 ft.

Weather season: Oct. 1 to Sept. 30

	March	April	May
Average daily maximum temperature	68.2	76.5	78
Average daily minimum temperature	43.6	49	52
Highest temperature	79	89	106
Lowest temperature	38	42	45
Number of clear days	6	15	11
Number of partly cloudy days	15	13	17
Number of cloudy days	9	0	3
Rain during this month	4.55	.02	T
Total rain since Oct. 1st	26.18	26.20	26.20

Calendar

July - August - September

ARBORETUM, ARCADIA

June and July
Summer classes for children. Sponsored by California Arboretum Foundation. Register by June 10. Call 447-8207 for information.

July 1 — 8 to 5:30 p.m.
Cactus Show
Sponsored by Cactus & succulent Society of America*

July 13
Anniversary Ball for members of the California Arboretum Foundation, 8 p.m. to 10 p.m., Demonstration Home Gardens

July 21, 22 — 8 to 5:30 p.m.
Begonia Show
Sponsored by San Gabriel Valley Begonia Society*

August 15
Registration opens for fall Youth Education workshops. Write now for information

September 17
Beginning of fall semester, Adult Education classes. Schedules available August 20

SOUTH COAST BOTANIC GARDEN, PALOS VERDES PENINSULA

September 2 — 1:30 to 4 p.m.
Bromeliad Associates meeting, open to the public

September 9 — 1:30 to 4 p.m.
South Bay Cactus & Succulent Society meeting, open to the public

September 23 — 1:30 to 4 p.m.
South Bay Herb Society meeting, open to the public

September 27, 28, 29
Flower Show Judges school

DESCANSO GARDENS, LA CANADA

July 22 — 3 p.m.
Concert by Glendale Community Symphony Orchestra

September 22, 23
Bonsai Show
Sponsored by Descanso Bonsai Society

BIRDWALKS

DESCANSO
2nd and 4th Sunday of each month at 8 a.m. Sponsored by San Fernando Audubon Society.

SOUTH COAST
3rd Wednesday of each month at 8 a.m. Sponsored by South Bay Audubon Society.

*Co-sponsored by California Arboretum Foundation

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September
1973
Vol. XXIII
No. 3

Lasca Leaves

MISSOURI BOTANICAL

JUN 21 1976

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Lasca Leaves

Published quarterly by the California Arboretum Foundation, Inc., for the Department of Arboreta and Botanic Gardens of Los Angeles County.

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Editor
Donald S. Dimond

COVER: Flower of *Chorisia speciosa*, See article page 99. Photo by Frank Simerly

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department notes

NEW OFFICERS

The annual election of officers of the Board of Trustees of the California Arboretum Foundation was conducted last June 19 following a Trustees dinner held in the Demonstration Home Gardens. The short, efficient meeting resulted in the election of Mrs. John A. (Tootie) Grivich, president; Mr. George L. Foreman, first vice-president; Mrs. Leland E. (Ruth Mary) Larson, second vice-president; Mrs. Ralph G. (Dolores K.) Hubbell, executive secretary, and Mr. Frank J. Regan, treasurer. The new president established two new posts on the board, a business membership chairman to which she appointed Mr. Foreman, and a general membership chairman to which she appointed outgoing president, Mrs. Peter L. Douglas. For the past ten years Mrs. Grivich, or Tootie as she is called by just about everybody, has been a member of the International Fern Society and the American Begonia Society, serving as show chairman for the latter for the past two years. A native Californian, Tootie has been growing begonias in her San Gabriel Valley home for a decade and in this time has collected over 400 blue ribbons and 50 trophies for her plants, all grown in containers. Her most recent honor as a plantswoman came during the begonia show last July at the Arboretum when her entry won the best-in-show award.

Outgoing president of the California Arboretum Foundation, Mrs. Peter L. Douglas, left, and new president, Mrs. John A. Grivich.

Photo by Milt Bell

ANNIVERSARY BALL

From 8 to nearly midnight on the evening of July 13, approximately 400 members of the California Arboretum Foundation and the Arboretum staff got together for an al fresco party, one of a yearlong series of events celebrating the Foundation's 25th anniversary. The party took place in the Demonstration Home Gardens and in front of the deck leading to the Garden For All Seasons. The deck itself served as a bandstand for two groups of musicians—the Arcadia Ramblers, a five-piece dixieland ensemble led by Dexter Jones, a lawyer by profession and trumpet player by avocation, and the three-piece (banjo, guitar, mandolin) country music group of Arboretum

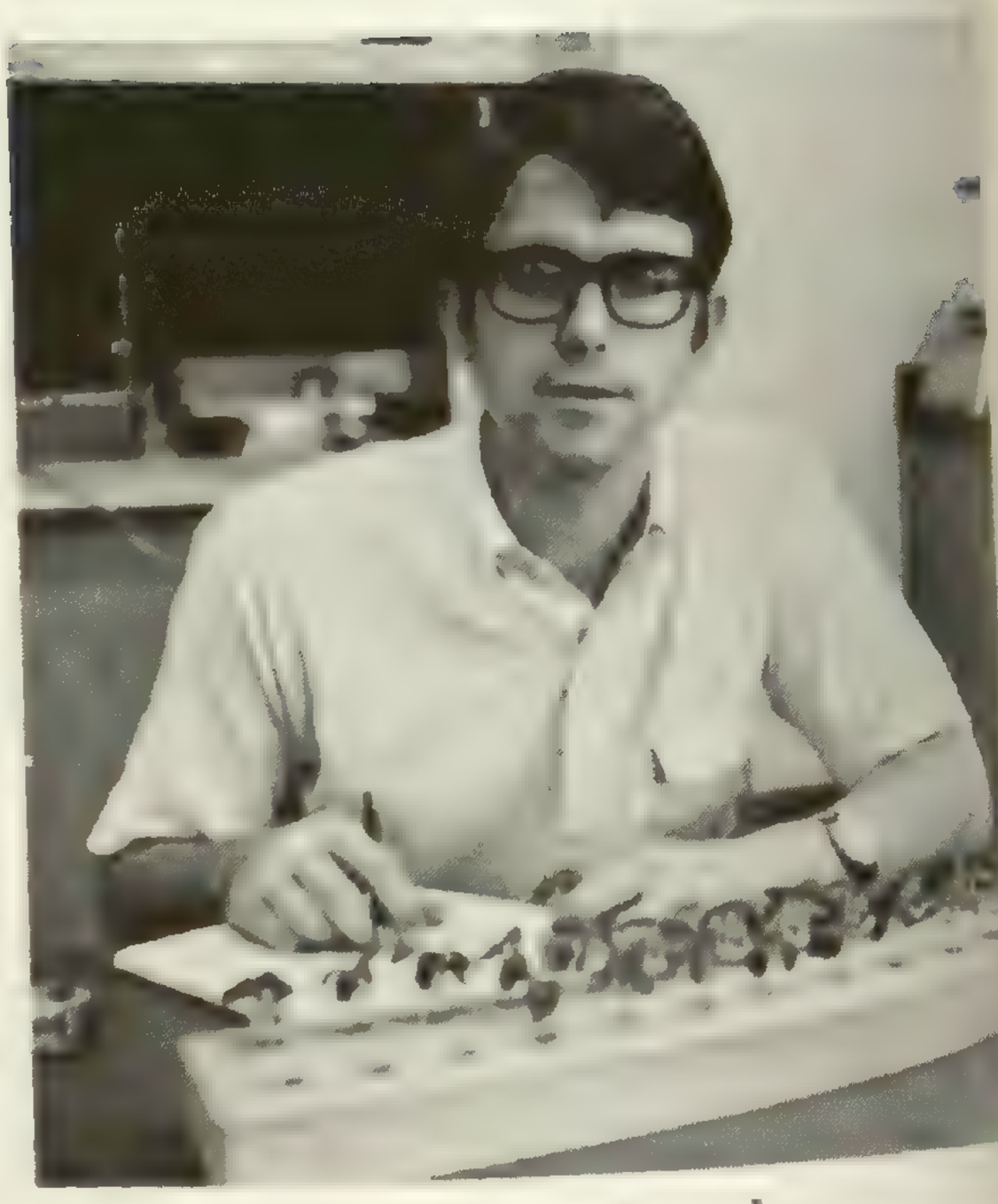
From left: Mrs. John A. Grivich, Dr. and Mrs. Samuel Ayres, Jr., and Mr. Francis Ching.
Photo by Milt Bell

groundsman Bruce Dustman, who in addition to doubling on violin shared the vocals with other members of his trio. Asked for a description of his music, Bruce said "our style is 'blue grass,' but I guess it would be simpler to say we play hillbilly music which is basically oldtime jigs and reels in modern form." The highlight of the evening was the cutting of the anniversary cake, a six-tiered, four-foot-tall confection in white, ornamented with palm trees, peacocks, flowers, and a large 25 in candied numbers on top. While Dexter Jones and his band played the Anniversary Waltz, Helen and Sam Ayres, representing the founders of the Foundation, followed by Tootie and John Grivich, Elaine and Francis Ching, Dolores Hubbell, Edna Kettle, and Hilda Sademan representing the present and the links between, successively cut the cake. The knife that was used was lent by assistant director Glenn Hiatt for the occasion—a wicked-looking machete that had seen service cutting through the South American jungle on botanizing trips. It was observed that Dr. and Mrs. Ayres handled this weapon with elegant ease, making the first incision with an expertise that suggested they were old hands at cutting anniversary cakes. During the serving, Elmer Sademan, the convivial master of ceremonies, traced the milestones in the Foundation's history and the part those on hand played in its development.

PLANT PHYSIOLOGIST

In 1971 Dr. Wayne Loescher took his doctorate in plant physiology and biochemistry at Iowa State University and followed this up with a two-year research project aimed at obtaining a hybrid between corn and sorghum. Then, with his wife, Judith, who has a doctor's degree in phycology, he came west to join the Research Division of this Department. We asked him how he classified himself in his field today and what would be his major activity here. This is what he said: "I generally tend to think of myself as a botanist, although with today's emphasis on specialization, I should perhaps call myself a plant physiologist. Plant physiology is a branch of botany that is concerned with the functions of living plants. In its present context, this means the functions of plants from the level of atoms and small molecules to that of the entire organism. The plant physiologist may be as concerned with the structure of a macromolecule as he may be with the response of an entire plant to some environmental stimulus. These different concerns mean that some plant physiologists may also be biochemists or biophysicists while others may also be ecologists.

"My particular interests have been concerned primarily with the factors controlling growth and development. Prior to joining the staff here at the Arboretum I was involved in a study of the factors required for the growth of plant cells and tissues when isolated from the intact plant. One of the objectives of this kind of research is to be able to induce small parts of a plant or even single cells to grow so that complete and intact plants are reformed. It is, in other words, a type of propagation, although more complicated than taking slips and cuttings and inducing them to root. The process, when successful, means that from



Dr. Wayne Loescher

a small part of a particularly desirable plant one can obtain progeny having identical characteristics.

"I am currently primarily interested in how growth hormones and other substances present in plants interact to induce roots to form at sites on leaves and stems where they are ordinarily absent. In some plants, root or bud formation at these sites occurs spontaneously when leaf or stem cuttings are taken. In other plants these processes will occur only after the cutting has been treated with supplements of various growth regulators. Many plants will not form buds or roots on cuttings regardless of the use of such supplements. Species of eucalyptus and the Ponderosa pine are in this category and an immediate project is to try to get them to root from cuttings by determining and controlling the limiting factors."

HERB SOCIETY

A common denominator among plant societies is the single-mindedness with which they pursue their interest. It is a

quality which makes possible successful planning and production of a major event like the 39th Annual Meeting of The Herb Society of America, which began last June 12 and ended four days later with an annual banquet at which Dr. Mildred Mathias, professor of botany and director of the Botanical Gardens at UCLA, was the principal speaker. In between, the 185 registered members from all parts of the country were taken on trips to private, public, and commercial herb gardens in the area and were guests at several luncheons at which herbs, of course, were the featured condiment. The Southern California Unit of the society was the host for the meeting and also the producers of the public weekend exhibit June 16th and 17th at the Arboretum which turned out to be one of the most attractive and well-attended this energetic group has ever put on. Continuing the meeting theme of "Renaissance of Herbs," visitors were educated and entertained by a record number of exhibits—the Herb Garden at the Arboretum, maintained by the Southern California unit, contains over 400 varieties—and at booths where visitors could smell or taste the cooking and fragrance herbs, or watch the making of herbal cosmetics and soup.

GIFT SHOP

Visitors to the Foundation gift shop at the Arboretum will note a new accent on merchandise directly or indirectly related to plants. An attractive new redwood platform just outside the shop now displays containers and various specialty plants not generally available at local nurseries. On the inside is a growing collection of handcrafted items designed for the homeowners' patio, windowsill, and the like. These items are made by the Arboretum's talented corps of volunteers who not only contribute their time to this work but do so in the understanding that profits from the sale of their handicraft are used to assist the many Arboretum projects not funded by the County.

SOUTH COAST BOTANIC GARDEN

The 11th annual Fiesta de Flores at South Coast Botanic Garden held last June 22, 23, and 24, attracted 4,500 people, a figure that would have been considerably larger had it not been for a big brush fire in adjoining areas that broke out on opening day and caused the closing of a number of access roads. Those that came over the weekend saw some of the most colorful displays yet seen at this yearly affair. One part of the Fiesta, the Carnival of Flowers, presented by the Costa Verde District of California Garden Clubs, had five competitive divisions open to both amateur and professional exhibitors. At the risk of singling out one division at the expense of another, the flower arrangement division attracted lots of attention with its designs bearing such titles as Cake Walk, Tunnel of Love, Big Top, and Box Office. According to competition rules, all were composed of at least some fresh plant material. Treated or dried plant material was permissible; no artificial flowers or foliage were allowed. Other highlights of the Fiesta were the tea ceremony presented four times Saturday and Sunday in a Japanese Garden setting prepared by Mr. Yamashiro; a group of strolling musicians playing flutes, recorders, and guitars; and a series of lectures. Dr. Paul Saffo, president of the South Coast Botanic Garden Foundation, had reason to be proud of all the talented and hardworking people who planned and executed the show.

DESCANSO GARDENS

The Descanso Gardens Guild, responsible for so many cultural events at Descanso Gardens, has provided visitors with an unusually varied bill of fare in recent weeks. Each presentation took place on the expanse of lawn near the entrance, giving an atmosphere much like that at Woodstock, New York, and other eastern pastoral sites of summer concerts. An art festival in early June brought together the works of some 75 Southern California artists expressed in conventional and unconventional media, the latter category including some stunning ceramic-on-stitchery, and art photography composed mainly of plant and bird time-shots. On July 22nd the Glendale Community Symphony Concert gave its second concert of the year at the Gardens, attracting an audience of over 3,000 people, a good part of whom heard the concert from vantage spots among the oaks where they had spread out their blankets. Earlier in the month the La Canada Players presented an evening performance of Jean Anouilh's "Antigone" to over 500 people, and on August 11 and 12 gave performances of five playlets for children.

HERBARIUM VOLUNTEERS

Not so much in the public eye as some other members of Las Voluntarias who work at the Arboretum, the herbarium volunteers are a key group who perform their special tasks in the quiet atmosphere of reference works and microscopes. Nancy Zabriskie, leader of the group and a longtime member of the California Arboretum Foundation, provided us with the following description of their work.

"What do two pretty young matrons, a great-grandmother, and a college student have in common? Since they are among the members of Las Voluntarias and a few unaffiliated volunteers at the Arboretum, you would expect them to share a love of plants, but more particularly, because they share an interest in the form, structure, and infinite variety of living plants as well as the botanical language which describes them, they contribute many hours of work in the herbarium under the guidance of curator Jeannette Huber.

"The great-grandmother, who became known as 'Mama Flower' during an African safari from which she brought back seed for our neighbor institution, Huntington Gardens, has collected plant specimens from Alaska to the Arroyo Seco in Pasadena. At the Arboretum she has spent most of her time at the glue-table in the herbarium mounting dried, pressed specimens of ornamental plants collected by others, and filing finished herbarium sheets in the large, gray cabinets where they are kept for ready reference.

"The student spent a great deal of time on the Arboretum grounds this past spring collecting and pressing specimens of shrubs and trees in flower, making careful notes on size, color, date, location, and other pertinent data from which, after checking reference literature in the library, he wrote the labels which will accompany the specimens when they are mounted.

"The two young women come once a week, working together to curate a valuable old plant collection, confirming the identification of each specimen by examination under a microscope for characteristics of the flowers, fruits, stems and leaves for conformation to the appropriate technical descriptions as found by using the key in an authoritative flora of the region where the collection was made. In difficult cases they may need to check further by consulting monographs in botanical periodicals.

"Other tasks undertaken by members of Las Voluntarias working in the herbarium include the application of strong plastic to woody portions or to fruit, seeds, or large leaves which cannot be held down by glue alone; statistical work; helping with the inventory; and filing. This last activity requires more than just knowledge of the alphabet. On its label a specimen is named by genus and species, but the sheet must be put into the genus folder filed with others of its family. Therefore, one must locate the family the particular genus belongs in; then, if it is a new genus for this herbarium, a new folder must be labeled. If there is already a genus folder, the particular species may be filed alphabetically among the other species in that folder. It's nice if you already know the family, but the non-botanist usually needs to refer to our well-thumbed copy of Willis. A faulty memory can lose a *Catalpa* quickly and semi-permanently if it permits tucking elsewhere than into BIGNONIACEAE. Happily, families are arranged alphabetically, with a few exceptions such as the ferns, the conifers and the special weed collection.

"Inventorying involves listing each item of *Acacia,* for example, where it was collected, whether it was from a LASCA collection or an exchange, and how many sheets of each collection number we may have. One of the founding members of Las Voluntarias is engaged in this statistical work and even though she is a longtime gardener, has become impressed with the tremendous variety and the many variations of *Acacia* and *Eucalyptus.* A new project for her has been checking place-names against geographical locations on maps to pinpoint them in more detail for an as yet unmounted collection from Western Australia, a very large area. Because the Arboretum grows many Australian plants for trial, demonstration, and introduction, differences in their native elevations and climates have a bearing on choices made among them.

"With increased public concern about the natural environment and the interest in edible weeds, poisonous plants, fire- or smog-resistant plants, and so forth, more taxpayers are bringing their questions to the office of the horticultural consultant. It is interesting and gratifying to be of occasional assistance in some problem involving plant identification. The herbarium is the reference tool by means of which we learn to do this. In this respect, and because it contains positive records of what grows on Arboretum grounds, the herbarium provides all of us members of Las Voluntarias who work there an education we could hardly find anywhere else."

EDUCATION

Although schools are generally no longer "out" for summer, fall is still the season when young and old alike renew their educational pursuits. It is also the time when educators introduce new courses and refurbish old ones. In the latter category are the fall schedules of youth and adult classes at the Arboretum, Descanso Gardens, and South Coast Botanic Garden. These are essentially basic classes in gardening, landscaping and botanical art for which there is a continuing demand. Two new classes added last year and repeated this year are a class in herbs and one covering poisonous plants of the area. Last fall a number of mini-courses were introduced at the Arboretum under the sponsorship of the California Arboretum Foundation. These proved so successful that the number of courses offered has been doubled for the 1973-74 season. They range from the relatively technical —Plant Physiology, Genetics and Plant Breeding — to such largely "how-to"

courses as Terrariums and Holiday Decorations.

All the courses are three-hour sessions starting at 9 o'clock in the morning. They meet anywhere from one to five times. All are available to members of the California Arboretum Foundation at 20% discount; one course, Botany I, is free to members. Schedules of the regular adult education classes and the minicourses are now available to the public. Foundation members will receive their copy in the mail.

BRIEFS —

After delays that seem inevitable in the construction business, the new Information Center is nearing completion. In addition to the existing steps, the public will have easy access to the information window and the rotunda above by means of two ramps ascending at an 8.33% rise, or one foot every twelve feet. This is lesse than a 4° grade and is in conformity with state regulations —

Close to 200 Foundation members and their children attended the Hugo Reid Roundup on June 30 held in the patio of the Hugo Reid Adobe and nearby areas. Carol Brayshaw supplied the recorded Mexican music for this family affair and checked on the games played in the Hugo Reid period which included bubble blowing, a form of musical chairs, a Mexican hat dance, and, for the little ones, amusement in the form of a number of simple Mexican instruments. The menu included *huevos rancheros, tortillas, frijoles, chocolate,* and *pan dulce* with department director Francis Ching, Mrs. Ching, Arboretum staffers Jess Tomory and Calvin Allen, and volunteers Mrs. Chester Wiliams, Mrs. Gordon Julien, Mrs. C. G. Morris and Helen Jenkins serving in the kitchen —

The second Queen Anne Frolic is coming up on Friday evening, September 28. Alice Coulombe, the Las Volutarias member organizing the event, reports the following: Once again there will be tours by vintage cars and horsedrawn carriages. Our own trams will take guests to Tallac Knoll where all the paths, the Meyberg Falls, and the nearly completed meadowbrook will be specially lighted so they can stroll about or walk back to the central scene of activity—the mall in front of the Queen Anne Cottage — without stumbling in the dark. The Cottage and the Coach Barn will be open for guided tours.

At the Hugo Reid Roundup, from left: Darwin, Belle, and Mike Deliman; Frances Deliman; Dr. and Mrs. Robert Deliman; Martha Carlson and son Chris.
Photo by Milt Bell

The dixieland band of Dexter Jones and the string band of Bruce Dustman, both heard during the recent anniversary ball, will supply the music. There will be a barbecued beef dinner, with Francis Ching the presiding chef. Like everything else, the tariff has gone up this year. Reservations, which close September 21, are now ten dollars per person. Invitations will be mailed to all members. Hours for the Frolic are 6 p.m. to 11 p.m. Volunteers are needed for selling script at the reservation desk and for other light duties. Please call Alice Coulombe at 796-4165.

Plants to Look For

Frank Simerly

One of the most spectacular fall flowering trees is the Brazilian *Chorisia speciosa* which is found in many locations on the Arboretum grounds. The tree has been aptly described as a giant strawberry ice cream cone when it is in bloom. The flowers are large, almost hibiscus-like, with showy petals that may be light or dark pink and are borne in great masses. The center of the flower will often be white or cream colored. The tree is considered evergreen, although it will lose most of its leaves just before flowering and then regain them shortly afterwards if the weather hasn't turned too cold.

The chorisia will accept temperatures down to 27° without damage, and will withstand 25° temperatures once established. *C. speciosa* was introduced into the trade in the 1930s, but then was lost with only a handful of trees known in 1949. At that time the Arboretum established plantings of the "Silk Floss Tree" as it is commonly called. As with many other flowering trees, these early introductions of the chorisia were aided by generous donations of seed from Dr. Samuel Ayres, Jr. Specimens can now be seen on Baldwin Avenue from Colorado to the Arboretum's main entrance, on the east side of the lagoon, and in quantity on top of Tallac Knoll. The tree is becoming a part of the Los Angeles landscape.

The chorisia is easily identified, even when not in flower, by its green bark that grays with age and which is often covered with thorns that may be one inch or more in diameter at the base. The presence or quantity of thorns is apparently a variable characteristic, as some trees are thornless or nearly so. In addition to the beautiful flowers and interesting bark,

Chorisia speciosa
Photo by William Aplin

mature trees may develop curious fruit about the size and shape of an avocado. When ripe, the fruit bursts open revealing the seeds embedded in a mass of kapok, hence the common name.

Through the years the Arboretum has discovered that chorisia trees don't care for the shallow watering given lawns and that good drainage is the key to vigorous growth. A significant seedling variation in flower color, thorniness, and height has also been noted. As a result, several grafts have been made of desirable selections. One of these, known as 'Clone B,' is shown on the cover of this issue. It will be available in the nursery trade soon. Some can be seen on the north Baldwin Avenue planting and on top of Tallac Knoll. The metal accession tags on these plants have the letter C on them. One of the very interesting grafts made was a bark inversion accomplished by removing a narrow band of bark from around the young plant's trunk and replacing it upside down. There appears to be a dwarfing effect as a result of this operation, and because the *Chorisia speciosa* is too large for the small home garden, this technique may have value.

The Arboretum also has *Chorisia insignis* planted in several locations. You will find trees of this species north of the Bauer Fountain, on the east edge of the lagoon, and on top of Talac Knoll. *C. insignis* has cream-colored flowers and apparently a more diminutive growth habit than *C. speciosa*. *C. insignis* is not as well known or as widely planted as its more colorful relation. However, grafts have been made using selections of *C. speciosa* on the root stock of *C. insignis*. This could be another way of scaling the *C. speciosa* down to a size suitable for small garden areas.

Increased use and interest in these chorisia trees by the Arboretum has undoubtedly fostered their wider use and availability. The Arboretum's experiments in selection and grafting should increase their usefulness. Be sure to look for these plants in flower this fall at South Coast Botanic Garden and in many locations at the Los Angeles State and County Arboretum.

Seed pod of *C. speciosa* showing silky floss enveloping seed.

White flowers and seed pods of *C. insignis*.
Photo by William Aplin

E. J. Baldwin

By Mr. Fraser

Notes taken during a visit to his Santa Anita Rancho.

(Editor's note: In August of 1891, a Mr. Fraser visited the Santa Anita Rancho of E. J. Baldwin for the purpose of taking some notes for use by his employer, the historian Hubert H. Bancroft, in a book entitled, "Chronicles of the Builders of the Commonwealth." As it turned out, Bancroft used very little of Mr. Fraser's material. A few months ago, during a visit to the Bancroft Library on the University of California campus at Berkeley, Patricia Warren, the Arboretum's historical curator, uncovered the notes in their original form. We felt our readers might enjoy them, not only for their historical association with the Arboretum, but for the innocent view they present of a past era when a life style reminiscent of a feudal baron could be widely accepted. We wish to express our thanks to Mrs. Warren for bringing these notes to our attention and to the Bancroft Library for their kind permission to print them here.)

"WE alighted at Santa Anita depot of the Santa Fe R.R. Co., right in the heart of this magnificent ranch of 60,000 acres. Stretched out before us was a level plain, covered with beautifully laid out orchards, vinyards, pastures, etc. This plain lies on a bench at the foot of the Sierra Madre mountains, with a gradual slope of about 40 feet to the mile. At the base of the mountains the land is rolling; small low hills with a scattered growth of oaks making a very pretty natural border to the land under cultivation. Mr. Baldwin has very wisely decided that these rolling hills shall be left in their natural wildness, as he considers that he has sufficient land to spare a few acres to delight the eye and enhance the beauty of the landscape. They are indeed a pleasing contrast to the more geometrical precision of the adjacent artificial groves of fruit and ornamental trees.

As we made our way on foot to the superintendent's house we entered one of the main avenues of the ranch, of which we could see no end, a lovely natural shade of light green peppers set off by a background of dark eucalyptus on the right and a plantation of Palm ferns on the left. The avenue is about 40 feet wide, and affords a cool retreat from the rays of a southern California sun, besides being a delightful rest to the eye. About a furlong from the depot we came upon the house of the late superintendent, a pretty rustic residence, which is now used as an eating house for the white laborers of the ranch. Some little distance further on and to the left is a small settlement consisting of a few huts in which live the Chinese, who board themselves.

"Following the avenue for another quarter of a mile we arrive at the Ranch-store and post office, a long rambling one story building in which Mr. Baldwin has everything for sale that his employees may need: clothes, hardware, meat, provisions, etc., etc. A printed notice in a conspicuous place informed us that no liquors would be dispensed to any of the employees. The store-keeper, a polite and friendly German, gave us what informa-

The ranch company store.

tion he considered consistent with his duty, and referred us to the general manager, Mr. H. A. Unruh, for full particulars. This is a typical California general merchandise store, and it is here that Mr. Baldwin may occasionally be seen taking a friendly glass with his employees, or indulging in a quiet and snug little game of cards, (penny limit). Our carriage having now arrived we got on board and started off to visit as many of the places of interest on the ranch that our limited time would allow. Our first objective point was the stables of the thoroughbreds under the management of Mr. B. F. Wood. Taking the cross-road to the right we passed through an avenue of stately poplars through which we caught occasional glimpses of pastures of Kentucky blue grass, alfalfa, and Australian rye grass, extending for about a mile parallel with the avenue, and behind which we could just make out the race-track, on which Mr. Wood trains his charges. As we went along we could trace the underground streams by the darker green strips of the vegetation. We were soon at the stables and our driver having made us acquainted with Mr. Wood, the latter gentleman proceeded to introduce us to the noble animals under his care. Mr. Baldwin raises and trains his horses entirely for the money there is in it, and displays excellent judgment in selecting the sires and dams for his stud which is amply borne out by the brilliant performances of his racers in the various events in the east, on more than one occasion his stable having carried off the blue ribbon of the turf. Mr. B. trains his horses as runners and not as trotters, those that he has in his stud having trotting records he keeps solely for breeding purposes.

"Our first introduction was to Colonel Miller by Wilson's Blue Bull, a dark chestnut of such beautiful symmetry as to remind one of the famous Arabian steed

of history. The next was a mare, Kitty Wink, with a trotting record of 2.23½ and to two other dams, Los Angeles and San Diego. We then interviewed the famous Emperor of Norfolk, who at the whistle of his master came trotting towards us to be caressed and fondled. This noble animal has one of the finest records in the annals of American horseflesh, having won the American Derby, the Drexel, and Sheridan stakes all in the same year, and is the only horse that has ever accomplished this feat. He was raised by Theodore Winters and Mr. Baldwin gave $2,000 for him when a two year old. He is a beautiful light bay weighing about 1100 pounds. Then came other horses of less importance: the Hook, 20 years old and still in the stud; Omega by imported Prince Charlie, a light chestnut 4 years old, Grinstead, an Australian horse. All the above are kept for breeding purposes, and at the present time there are 43 brood mares on the ranch. Mr. Baldwin has a stable of 20 horses this year in the east doing battle for his colors. In purchasing horses for his stud, Mr. Baldwin selects them by their general record; he will not buy a horse that makes one brilliant performance and then disappears like a meteor, but takes that one that keeps up his record from the beginning to the end of his racing career.

Eucalyptus Walk at the Baldwin ranch and mission bell used to call ranch hands.
Photo courtesy of L.A. County Museum of Natural History

Mr. Baldwin is very fond of driving, and when down on his ranch takes out his four-in-hand. He generally brings down 2 or 3 ladies with him, who stay here from two to three weeks. Mr. B. is quite partial to the opposite sex and generally has some around when he visits Santa Anita. Mr. B. is very friendly and sociable to his employees, and has always a pleasant word or nod for them. It is said he is a very slow paymaster, and at the present time owes something like $3,000 to his employees. There is no trouble in getting their money when they come to leave his service, and they usually have quite a little sum of money coming to them; for instance, the other day two of his hands quit his service, one a boy and the other a man. The former received a check, for wages due, of $750, and the latter, $550. A man does not need much money on the ranch, however, as he can get all the clothes and little luxuries at the ranch store and of course he is boarded free. His wages go on right along, and if he is modest in his requirements there will not be much to deduct for his store account, and he can

View of oak trees and ditch where today there is a road on Tallac Knoll.
Photo courtesy of L.A. County Museum of Natural History

easily save quite a large sum of money.

Mr. Baldwin has quite a reputation among the farmers adjoining his ranch for luck. When they see him begin to scratch his land they start right into plowing. It is related that one very dry season it so happened that Mr. Baldwin had put his crops in late and almost directly afterwards a fine rain set in, which was almost too late for the others but just in the nick of time for him. Then when haying time came around and most of the farmers had their hay cut, and Mr. B.'s looked as if it would hardly mature down came a week's rain just giving the finishing touch to his but almost totally ruining three-fourths of the other crops, thus keeping up his name as 'Lucky' down here as well as in the City. The farmers, therfore, watch a good deal, and take their cue from Mr. Baldwin.

"Mr. B. is by no means a liberal man; never knew him to tip any of his hands or anyone who did a service for him. He employs a large number of people on this ranch, mostly single men, though there are 4 or 5 white families, 5 Mexican families and quite a number of Chinese. He furnishes houses for his married employees, but they have to purchase all their food, clothes, hardware, fuel, etc., at his store. A remarkable feature of this ranch is the abundance of water. The place is full of natural springs; then there is the pipe line that brings the water from the mountains, one of the tunnels being bored 380 feet into the solid granite and being 12 feet wide and 10 feet high.

After leaving Mr. Woods, we turned back down the avenue of poplars and on reaching the cross - roads again branched off to the right, following the avenue we first entered for about half a mile passing an enormous feed stable where all the work horses of the ranch are stabled; continuing through the avenue of bright green peppers we could see

laid out on both sides interminable stretches of orange groves, plantations of ornamental shrubs, nurseries for all kinds of trees, and orchards upon orchards of different fruits, and vineyards, etc., etc. Some distance farther on to the right we came upon a miniature deer park full of pretty green knolls spotted with graceful shade trees, and at the farther end of which was an artificial lake and salt-lick for the 30 odd occupants of the park, nearly all of which were raised on the place. Directly after leaving this and to the left we found, hidden in a wall of ever-green hedges, and surrounded by semi-tropical foliage, Mr. Balwin's private coach house, in which he has stored 14 carriages of different styles for his private use. At this point the avenue suddenly opens into a vast expanse of lawns laid out with brilliant colored flower-beds, and dotted with ornamental trees and ferns, conspicuous among which are the graceful weeping willow. Some distance in front of us we see Mr. Baldwin's private residence nestling in a bank of foliage, affording a perfect shade from the rays of the sun. Around the house are smaller lawns, and a perfect galaxy of flower-beds in which the gardener's art has displayed all its cunning and ingenuity, interspersed with superb weeping willows, ornamental trees, palms, ferns, etc., combining to produce a scene of ravishing beauty. In the centre of the larger lawn is an old log cabin which I presume is a reminiscence of Mr. Baldwin's mining days. We approach the house through a walk arched over by foliage, in the middle of which we meet with one of California's oldest pioneers, carefully sheltered from the elements by a roofing of old Mission tiles; it is a bell brought from the Mission San Gabriel, now used to call the ranch hands to their work or meals. Behind this bell is an artesian well, supplying a small pond with its steady flow of water, looking like sheet ice in its clearness. Now we have the house immediately in front of us; it is a quaint one story building of Japanese design surrounded by a low porch hung with lanterns, to which we ascend by a flight of marble steps at the foot of which are two artesian wells, one on either side bubbling up from the bowels of the earth, and overflowing into a marble aqueduct running around the cottage, and almost hidden by bright colored flowering creepers. Walking round the porch, as the doors are all locked we have to content ourselves with peeping through the windows, and can dimly make out a sleeping chamber with a gold-plated and luxuriously covered bed in the centre, old fashioned furniture, and pictures of half nude Venuses and cupids on the walls. The windows are of plate glass, with a border of strained glass on which the female form is depicted in all its voluptuousness. On geting round to the rear of the house we find it to be surrounded on three sides by an artificial lake, 7 acres in extent, the banks of which are covered with a luxuriant growth of natural foliage, rising out of which is an occasional weeping willow. This sweet little bijou residence with its surroundings of romantic scenery is like a page out of fairy-land, and one almost fancies he has found the home of our friends the elves. In order that the odor of the kitchen shall not invade the perfume-laden air, Mr. Baldwin has his dining hall and kitchen in a separate building about 40 yards to the left of the dwelling house. Having already lingered too long in this enchanting spot we reluctantly retraced our steps to the carriage, and instructed the driver to convey us to the winery as the next point of interest. On the way we passed the dairy. Mr. B. has 150 milch cows, and supplies both his ranch and hotel with cream and butter. A little to the rear of the dairy is the brickyard, where he

makes his own brick, sells to the public at $10 per thousand, has a railway track laid from his brickyard to Santa Anita depot. Passed his slaughter houses, cattle corrals. Has large herds of cattle, sheep and hogs, kills his own meat and retails it to the public at 10 to 12 cents per pound. Ships carcasses to his hotel in San Francisco.

"Having reached the winery, of which Mr. Sweitzer has the management, we were shown over this establishment by his son, Mr. S. being sick with rheumatism. Mr. Baldwin raises all kinds of grapes and manufactures nearly every variety of wine, besides brandy, for which this vineyard is quite famous, and orange champagne; this latter drink is becoming very popular, and Mr. Baldwin retails considerable quantities over the bar at the Baldwin hotel; the oranges are pressed and the liquor fermented at the Santa Anita winery; it is then put into casks and shipped to San Francisco to be made into champagne. The liquor as it leaves the winery is perfectly colorless like water and has a strong orange flavor. The orange seeds are collected and sold for a dollar and a quarter per quart.

"Here he has one large brick building entirely devoted to the storage of sherry, and three wooden buildings for his other wines and brandies, each containing about 50 enormous casks, which hold 1500 gallons a piece. In one buiding he has stored 800 55-gal. barrels of brandy. We saw some fancy casks Mr. Baldwin is having constructed to send to the World's fair in 1893. He has a very fine muscat wine that he keeps specially for his lady friends; it is 8 years old and worth at least $5 per gallon. Mr. Baldwin does all his own bottling, and in the rear of the winery is the distillery. This is all managed by Mr. Sweitzer and his son, the manual labor, coopering, etc., being done by chinamen. Mr. Sweitzer informed us that they had about twenty acres of Mission vines all destroyed by some animalculae that came down from the mountains, and they had to pull them all up to prevent it spreading to the other vines.

Behind the distillery was an enormous bank of cactus about 12 feet in height and covered with fruit which looked very much like prickly pears. Mr. Sweitzer said that Mr. B., whenever he can, leaves nature as it is. Keeps as much natural scenery as possible about the ranch. Will not allow any of the native trees to be cut down; if they want wood, have to go into the mountains and collect drift-wood. There is nothing wasted on this ranch; orange seeds are collected and sold, drift-wood gathered up, cattle heads and refuse given to the hogs and everything is carefully watched and turned to some account. Bananas and limes will grow here, but they don't reach maturity as this is a semi-tropical climate, not a tropical one.

There are 2500 tons of hay raised on the ranch, of which we feed 800 tons to our own stock and sell 1700 tons. The land is sown in hay one year, and grain the next, so as to give it a rest.

Mr. Baldwin sold about 1100 acres of land in the Sierra Madre range about 7 years ago, and the land turned out to be so productive that there is now a town up there of 500 inhabitants; it is called Sierra Madre. They are talking of building a railroad up to Wilson's peak (the highest point that overlooks the ranch, 6,000 feet above sea level), and Mr. Baldwin has offered to subscribe $1000. There is to be an observatory there which is to out-rival the Lick. The glass will be a 40 inch, while the Lick is only a 36 inch glass.

Mr. Unruh drove up to the winery and invited us to take dinner with the ranch hands and then meet him for a dictation. We accordingly repaired to the cook-house and partook of an excellent meal of plain wholesome food."

Fall Color In Southern California

Ross Goodrich

A great number of trees and shrubs in Southern California make a good show of fall color. Because the changes appear over a long period, some get little notice from those who must have a spectacular display all at one time.

To expect fall color here such as there is in Vermont, New Hampshire and New York is asking a lot. There, most of the color is in broad forests of native trees that respond quickly to the temperature changes of coming winter, give a magnificent show for a few weeks, then are gone. Here, when we plant the same maples, oaks, and other trees we can only hope for a year now and then when the temperature drops early enough in the season to color them up. And, we can't grow them in large areas where there is no summer water. It's the climate.

Of our commonly planted trees, the liquidambar is very colorful. It is dependable for a long display of red, yellow and orange — sometimes with all three colors on the same tree. Others are the Modesto ash, the tulip tree and the mulberry, each turning yellow. And though often overlooked in regard to fall color, the pomegranate, the crape myrtle and the common snowball are very good. The pomegranate turns a briliant yellow even while it holds on to some green leaves, the crape mrytle gives a good show of yellow although it often loses its leaves rather quickly, but the snowball holds on for a long time with dark red leaves.

Though not widely planted in this area until the last two decades, the gingko needs mentioning here. Its yellow leaves stay on the tree a long time, shimmering in each little movement of air just like the aspen. The large ginkgos near the Coach Barn in the Arboretum have become landmarks and attract much attention each year. These particular trees were grown from seed gathered by Elias J. "Lucky" Baldwin on a trip to the Orient.

Factors that affect the variations in fall color can be the soil and its pH reading, the feeding and watering, and the weather that sparks the immediate change in color. Our unpredictable hot spells in early fall can cancel out a color change or shorten the duration of it, but this has also happened off and on in the New England States. Temperature records in the recorder's office at the Arboretum show that for the months of October and November the first low temperatures usually come in late October, or at least from the middle of the month on in the years these color observations were made.

The list of trees and shrubs that have shown fall color in the Asiatic - North American section of the Arboretum includes short comments as to whether they were consistently good, or just so-so, with approximate time of color. This information is from a period of fifteen years: 1956 to 1961, 1963, 1968 and 1971, with off-and-on observations in the intervening years. It should be mentioned that some of these plants were not with us over the entire period, and those considered too immature for a fair judgment were simply ignored for this report.

Acer buergerianum, Trident Maple—varies, both yellow and red sometimes on same leaf, late November early December.

Acer capillipes — brilliant red, sometimes turns all at once but lasting only a week; other times changing from the top of the tree to the bottom, slowly, late November early December.

Acer davidii, David Maple — slowly turns yellow, November, December.

Acer diabolicum, Devil Maple—mixed yellow and green with red, November.

Acer griseum, Paperback Maple—good dark red, slow to turn, November to early December.

Acer grosseri, Grosser's Maple—mostly bright yellow, some orange, mid-November to December.

Acer macrophylla, Bigleaf Maple — good yellow, November, December.

Acer morrisonense — bright red, late November.

Berberis julianae, Wintergreen Berberis —red, November, December.

Betula platyphylla japonica — yellow, late November.

Betula nigra, Red or River Birch—yellow, October; not good all years.

Ciltis wildenowiana, good yellow, November.

Cornus kousa, Kousa Dogwood — red, fairly good, November, December.

Cornus officinalis, Japanese Cornel Dogwood—dark red, November.

Cotinus coggygria (Rhus cotinus), Smoke tree—good orange, red and green,

Ginkgo biloba

all at the same time, November, December.

Cotoneaster cooperi, Cooper's Cotoneaster—dark red, spectacular a few years, other years no, November, December.

Cotoneaster harroviana, Harrow Cotoneaster—moderately good dark red, November, December.

Firmiana platanifolia (F. simplex) Chinese Parasol tree—good even yellow, November.

Fraxinus chinensis rhynchophylla, Korean ash,—even light yellow, November.

Fraxinus velutina, "Modesto" ash, — orange to light yellow, November.

Ginkgo biloba, Maidenhair Tree—yellow, November, December.

Hydrangea quercifolia, Oakleaf Hydrangea—dark red, December.

Koelreuteria apiculata, yellow, November to mid December.

Koelreuteria formosana, yellow, November, December.

Koelreuteria integrifoliola, yellow, November, December.

Lagerstroemia indica, Crape Myrtle—effect is mothly orange but includes red, yellow and green, November.

Liritdendron tulipifera, Tulip Tree — yellow, November, December.

Liquidambar formosana, Chinese Sweet Gum—mostly yellow, November, December.

Liquidambar orientalis, Oriental Sweet Gum—some trees yellow, some trees red, November, December.

Liquidambar styraciflua, American Sweet Gum—some trees yellow, some red, some orange, some mixed, November, December.

Malus prunifolia, Pearleaf Crabapple—good bright red, November, mid December.

Morus alba, White Mulberry—bright yellow but doesn't turn all at once, November, December.

Nyssa sinersis, Chinese Tupelo—a really bright red, November, mid December.

Nyssa sylvatica, Sour Gum or Black Tupelo—brilliant red and orange, November.

Pistacia chinensis, Chinese Pistache — a few years yellow, one year red, just so-so, November to mid December.

Punica granatum, Common Pomegranate — good bright yellow, turns slowly then drops fast, November.

Pyrus calleryana, fairly good orange with some red, November.

Quercus alba, White Oak — the past year was its best — red all over, other years only partly turned, November.

Quercus rubia, Northern Oak—bright red for short period, November.

Quercus palustris, Pin Oak — red with brownish red, November.

Rhus typhina, Staghorn Sumac—brilliant red, November early December.

Sapium sebiferum, Chinese Tallow Tree—yellow but some leaves turn red, November, December.

Ulmus crassifolia, Cedar Elm — good orange yellow, November.

Viburnum dentatum pubescens, red, fair, November mid December.

Viburnum opulis cv. Roseum, Common Snowball—good red, November.

Viburnum prunifolium, Black Haw—some are brilliant red, some yellow, some mixed, November.

Viburnum rufidulum, Southern Black Haw—consistently good deep red, November, December.

Vitis californica, California Grape—some brilliant yellow, some deep red, November, December.

Wisteria sinensis and *W. floribunda,* yellow, November, December.

Zelkova serrata, Japanese Zelkova — dark red, sometimes reddish brown, November, December.

Ross Goodrich is an Arboretum gardener responsible for the Asiatic-North American section.

Mites Attacking Pines

Richard J. McCrea

A tiny mite, *Oligonychus milleri,* has been doing serious damage to our pines. This small tetranychid mite, scarcely larger than a speck of dust, is reddish in color with small black areas showing through dorsally. Its eggs are salmon to reddish with a darker area on top of the eggs. Eggs are laid at the base of needles and on small twigs.

First symptom of damage is a speckled mottling of the needles caused by the tiny punctures of the feeding mite. The more obvious symptom is the dead and browning of the tip growth normally called "flagging." By the time "flagging" has been noticed, a heavy infestation of the mite is inevitable and treatment is necessary. Probably the easiest way to inspect for this mite is to slap the suspected pine branch end on a clip board covered with a white sheet of paper. The small mite can be picked up with a small brush dampened with alcohol.

Oligonychus milleri McGregor was first found and named on *Pinus ponderosa* in Placerville, California, in 1950. Specimens have been taken on ponderosa pine in Idaho; on Scots pine in Utah; on jackpine from Wisconsin; on loblolly pine in Louisiana and on undesignated pines from Arizona, California, Delaware, Florida, North Carolina and Virginia.

Recently about 20,000 Aleppo pines located on about 300 acres in the Castaic Dam area were found to be infested with *Oligonychus milleri* and *Essigella californica,* Monterey pine aphid. Most of these trees will be treated by helicopter in April with a mixture of Kelthane and Meta-systox-R.

Many of the Aleppo pines in Los Angeles County are infested with this troublesome mite. One street planting of Aleppo pines in the town of Downey shows extensive flagging damage by this mite.

In 1970, we found infestations of *Oligonychus milleri* in our San Gabriel Mountain pines indicating how widely spread these infestations are.

Taxonomy

Adults of *Oligonychus milleri* have the dorsocentral settae successively increasing in length, the first pair being short, the second pair longer, and the third pair much longer than the first (Fig. 1). The distal end of the aedeagus is very long, from two thirds to as long as the dorsal portion of the shaft and

Fig. 1. *Olyigonychus milleri:* dorsal aspect of female.

Fig. 2. *Oligonychus milleri:* aedeagus.

Fig. 3. *Oligonychus milleri:* tibia and tarsus I of female.

there is a very broad curvature of the shaft (Fig. 2).

Tibia I has six tactile setae and tarsus I has one tactile setae proximal to duplex setae as described by Prichard and Baker, 1955, (Fig. 3).

Control

Kelthane (dicofol) is generally accepted as the insecticide that will best control this pest. Follow instructions on the label for safe usage of this chemical.

To simplify information, it is sometimes necessary to use trade names of products or equipment. No endorsement of named products is intended nor is criticsm implied of similar products not mentioned.

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Richard J. McCrea is an entomologist in the Laboratory Services Division of the Los Angeles County Agricultural Commissioner.

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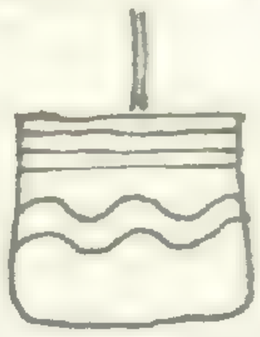

BOOKSHELF

MODELS OF DOOM, A critique of THE LIMITS TO GROWTH. Critique edited by H. S. D. Cole, Marie Jahoda and K. L. R. Pavitt; with a reply by the authors of THE LIMITS TO GROWTH. Universe Books, New York 1973.

Early in the 19th century Thomas Robert Malthus advanced the theory that a population tends to outgrow its capacity to feed itself. The tendency had not gone unnoticed before; it was observed in ancient China, and could be noted in the present century on islands such as Sardinia where the ancestral farms became smaller and smaller by division with each generation, until none of them were capable of supporting a family. England was saved from increasing starvation by trade with her food-producing dominions, so Malthus' gloomy prophecies did not come true. But he had supported his theories by collecting data, which he treated mathematically and logically, so they became a continuing source of controversy among professionals. Properly speaking, he was neither a prophet nor a "doomster" but a forecaster; one who assesses probability of certain outcomes in the light of the data obtainable. A forecast may always be altered as events occur either through man's will or fortuitously.

Malthusian theory is again in the spotlight but in broader form, that is, with food supply as only one of five key factors of the capital-industrial system as it has functioned since 1900; also, with more sophisticated treatment which includes, besides a mass of data too large to keep track of without a computer, some "world models" and system dynamics. Working with these, the so-called "MIT Group," authors of THE LIMITS TO GROWTH, attempted to answer the question: "What is likely to happen when there is continued rapid growth of industry, food production, and population in a world of limited resources? The answer they got was no less than this: a catastrophic collapse of the system, and soon—around the year 2100, in fact. Because they felt that social scientists, politicians and the general public must understand their work and make plans for altering the system, they published their book. But with it there was needed evaluation and criticism by scientific personnel. This is provided by the book, MODELS OF DOOM, written by thirteen members of the Science Policy Research Unit of Sussex University, England. Like LIMITS TO GROWTH, it is written for the general reader. The criticism is severe.

The answer you get from a computer, the Susesx group points out, depends on the assumptions you make when you feed data into it; these in turn are influenced by your personal philosophy and the milieu of the time, no matter how you try to be objective. They characterize the study as "Malthus with a Computer," paraphrasing the sneering remark, "gigo," (garbage in, garbage out), with "Malthus in, Malthus out." Their differences with the authors of LIMITS TO GROWTH stem even more from principles than from technicalities.

The authors of LIMITS TO GROWTH, who get another inning in the form of a reply to the criticism in the last chapter of MODELS OF DOOM, cheerfully admit the Malthusian influence. They feel that it discredits them no more than Malthus should have been discredited when his forecasts did not prove correct only because he had not foreseen the great advances in transportation and technology in the late 19th century. We cannot expect another such breakthrough, they say — and most scientists will agree — and there are, indeed, reasons why this cannot happen. It follows that we should try to create a civilization of stable equilibrium. They paint a picture of the possible pleasantness of such a civilization, if we will alter our values somewhat, and secure a more even distribution of wealth. There could be food enough for everyone and an average income about equal to that of Western Europe today . . . "Utopian," scoff the critics. The MIT study was sponsored by the Club of Rome, and Prof.

Garden For All Seasons, Los Angeles State and County Arboretum.

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Dennis Meadows of the U.S. headed the team, which was international and interdisciplinary. The team chose to work at the Massachusetts Institute of Technology because it was there that Prof. Jay Forrester had pioneered in system dynamics and worked out a "world model" which he later improved and called World 2. Meadows' team made another model incorporating far more data, and called it World 3.

A world model is a representation of the growth, present size, and interactions of such factors as capital and industry, population, agriculture, pollution, and the diminishing of non-renewable resources. Its dynamic tendencies are shown by interlocking loops; there are for each factor positive input loops and negative feedback loops. For example, in the case of population, births per year form the positive input, deaths per year the negative feedback. In another case, investment rate is shown flowing into investment, this into industrial capital, men and machines, which in turn generate more investment, — these forming the positive input, while depreciation, etc., forms the negative feedback. A diagram of World 3 is given in LIMITS TO GROWTH, p. 102, and the complete models, World 2 and World 3, appear in MODELS OF DOOM, pp. 17 and 20.

From these it appears that food production, industrial output, and population have been growing exponentially (i.e., in the manner of compound interest), since 1900, and that with the using up of non-renewable resources, industrial growth must cease suddenly, shortly thereafter the population of the world cannot be supplied with its wants, pollution will have increased perhaps intolerably, and the system will collapse. Doubling the resources or altering the growth rate of any one or even three of the factors postponed, but did not prevent, the collapse. The pattern is a familiar one to many who work in the life sciences, and see it constantly, as Dr. Eric Yensen says, in microorganisms in everything from protozoa to deer. When a population exceeds the "carrying capacity" of its territory, it may "crash." It is easier for those who see this in real life to accept the idea, probably, than for others.

The Sussex group, authors of MODELS OF DOOM, themselves experimented with World 2 and World 3. With World 3 they managed, by changing the assumptions and assigning different weights to certain data, and increasing the negative feedback, to get a printout showing that growth could continue indefinitely, or at least with no sign of collapse, by 2300 A.D., and with only a leveling off of resources somewhat before that. In these changes of assumptions they feel that they have compensated for Meadows' pessimism with their own optimism, so that the results should be free of this bias, at least.

Their optimism is based in part on man's capacity for taking voluntary unforseeable action and they say that this should have been represented in the programming. It is difficult to see how it could be quantified, but it could form part of a "mental model," which they feel is in ways superior to the models which are so severely limited to the physical. This team is also interdisciplinary; its coordinator, Prof. Jahoda, is a social pyschologist. The Sussex group does agree that many social problems are urgent and global. But they would favor working first on the obvious one of "distribution of resources between the rich and the poor on a national and international scale," and of the apportionment of research and development, "only 2% of which is now going to underdeveloped countries, and 50% to national and prestige objectives."

Much subjective material is included in MODELS OF DOOM. In one sense the effort on part of both teams may be epoch making, because it is very seldom that physical and social scientists have tried to work together so closely. It seems rather like the joining hands of Koestler's Yogi and Commissar. The subjective judgment and departure from straightforward objective reasoning may make this book more interesting to the non-scientist reader.

For as a readable book, MODELS rates high; its style has pace and spirit and carries one along through material that might have made it ponderous, but did not.

We are left in the sadly familiar position of not knowing quite what to think when the experts disagree. If alarmed we can only, while awaiting more knowledge, console ourselves that, as Leo Rosten put it, "Rome wasn't burned in a day." —Marcella Juhren

RECENT ACQUISITIONS TO LASCA LIBRARY

WOODY PLANTS OF THE MORTON ARBORETUM, Walter Eickhorst. Lisle, Ill., 1972. 250 p. No illustrations.

GROWERS WEED IDNTIFICATION HANDBOOK, University of California Agricultural Extension Service, Berkeley, Calif. 1973. Color photographs.

LIMITS TO GROWTH, Donella and Dennis Meadows, New American Library, Inc., N.Y. 1972. 207 p.

MODELS OF DOOM, A Critique of The Limits To Growth, edited by H. S. D. Cole, Christopher Freeman, Marie Jahoda, and K. L. R. Pavitt. Universe Books, N.Y. 1973. 245 p.

INTERNATIONAL CHECKLIST OF CULTIVATED **ILEX**, G. K. Eisenbeiss, U.S. Government Printing Office, Washington, D.C. 1973. 85 p. No photographs.

FLOWERING PLANTS OF JAMAICA, C. D. Adams, University of the West Indies, Mona, Jamaica. 1972. 848 pp. No illustrations.

TREES OF SOUTHERN AFRICA, Eve Palmer, Vol. 1. Balkema, Cape Town, S. A. 703 p. Black and white and color illustrations, drawings and photographs.

GLADIOLUS, G. J. Lewis, Purnell, Cape Town, S. Africa. 1972. 316 p. Black and white and color illustrations.

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ARBORETUM WEATHER

Long. 34°08'48" N.
Lat. 118°02'59" N.
Elev. 571.28 ft.

Weather season:
Oct. 1 to Sept. 30

	June	July
Average daily maximum temperature	93.1	91.8
Average daily minimum temperature	57.7	56.9
Highest temperature	111	110
Lowest temperature	50	52
Number of clear days	16	17
Number of partly cloudy days	12	14
Number of cloudy days	1	0
Rain during this month	0	0
Total rain since Oct. 1st	26.20	20.20

Calendar

October - November - December

ARBORETUM, ARCADIA

October 6, 7 — 8 to 5 p.m.
Bonsai Show
Sponsored by Akebono Bonsai Society*

October 12 — 8 p.m.
Theodore Payne Foundation native plant lecture.

October 23
Pasadena Arts Council Meeting and Luncheon (Write for information)

October 27, 28—8 to 5 p.m.
Fall Flower Show
Sponsored by Pasadena Star News*

November 10, 11 — 8 to 5 p.m.
Fall Mum Show
Sponsored by the Pasadena Horticultural Society*

November 18 — 2 p.m.
Sunday Afternoon Lecture — "Vegetable Gardening," Tak Niiya, Arboretum Education Specialist.
Sponsored by the California Arboretum Foundation

December 8, 9 — 8 to 5 p.m.
Camellia Show
Sponsored by the Southern California Camellia Show Inc.*

DESCANSO GARDENS, LA CANADA

October 27, 28 — 10 to 5 p.m.
Chrysanthemum Show
Sponsored by Glendale Chrysanthemum Society

December 1 - 9 — 9 to 4:30 p.m.
Christmas Decorations Exhibit
Sponsored by Descanso Gardens Guild

BIRDWALKS

DESCANSO GARDENS
2nd and 4th Sunday of each month at 8 a.m.
Sponsored by San Fernando Aubudon Society

SOUTH COAST BOTANIC GARDEN, PALOS VERDES PENINSULA
3rd Wednesday of each month at 8 a.m.
Sponsored by South Bay Audubon Society

*Co-sponsored by California Arboretum Foundation

December
1973
Vol. XXIII
No. 4

Lasca Leaves

JAN 8 - 1974

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December
1973
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Lasca Leaves

Published quarterly by the California Arboretum Foundation, Inc., for the Department of Arboreta and Botanic Gardens of Los Angeles County.

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Donald S. Dimond

Cover photo by Francis Ching

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Department Notes

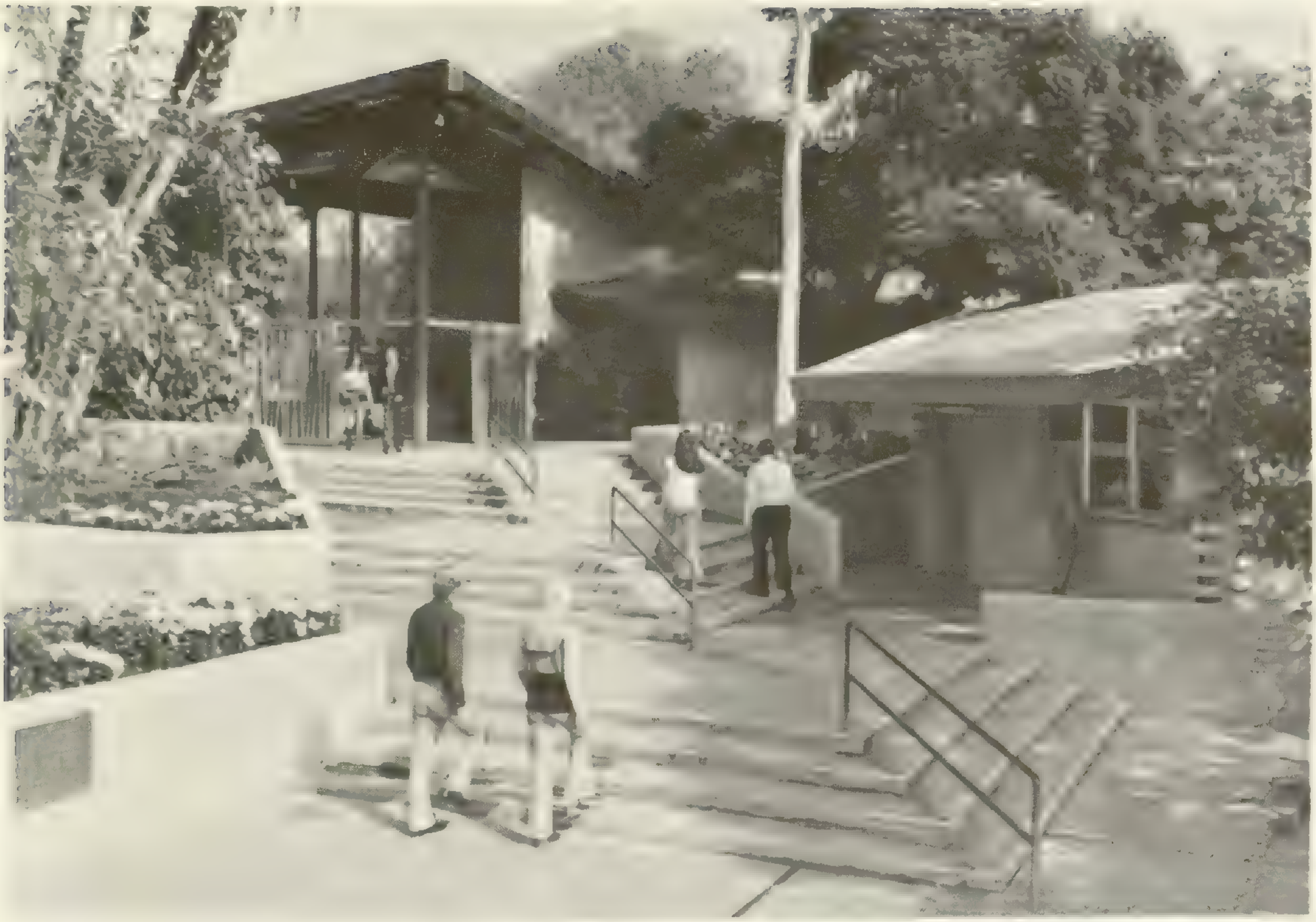
RETIREMENT

BY THE beginning of the new year this Department will have lost through retirement six longtime employees. They are Glenn Hiatt, assistant director; Gertrude Woods, education chief; Mark Anthony, Descanso Gardens superintendent; Jess Tomory, senior equipment maintenance man; Karl Roth, tractor operator; and Henry Noerdlinger, tour guide at South Coast.

Although institutions get their recognizable form from buildings and other landmarks, their essential character comes from people. When even a few leave a change takes place, a change that arises not only from the absence of a familiar face, but from the loss of an individual style and a distinctive approach to a job. These are the things we miss, even while anticipating the arrival of new faces, new styles, and new approaches.

Glenn Hiatt will be remembered for his quietly effective back-up role to two directors and his service as acting-director in interim periods. Also, for nearly 17 years he has been responsible for the implementation of the Department's most important capital projects, which he invariably achieved because of his intimate knowledge of the bureaucratic process and his natural friendliness and tact, qualities not easily replaced. Gertrude Woods has brought an energetic and innovative style to her 16 years of service in various fields of education. It was she who established the Department's youth education program, so admired and imitated across the country. By continuously complementing her own teaching experience with the latest knowledge developed by curricula specialists, she has aided the Department immeasurably in its school field-trip program. Over at Descanso, the superintendent with the classic name has left a 20-year imprint on that garden not soon forgotten. A horticulturist with a special interest in camellias, Mark Anthony can justifiably claim a good share of the credit for the world-famed beauty of the garden's camellia forest. A more accurate title for Jess Tomory, a veteran of 18 years of County service, might be jack-of-all-trades and master of most. From laying underground pipes and electrical circuits to accomplishments in just about every aspect of the building trades, no one at the Arboretum could leave more lasting evidence of his work. In part, the same can be said for Karl Roth, whose manipulation of his motorized earth-mover has literally changed the face of the Arboretum, most recently in the creation of the new five-acre meadow-brook. At South Coast, being the only full-time tour guide would be enough to establish a certain pattern for that operation; being Henry Noerdlinger, who became a tour guide only five years ago following retirement from a long career in the motion picture industry, the imprint is somewhat deeper, especially as Mr. Noerdlinger has presided over a number of public service innovations, notably the introduction of tram tours.

Post-retirement plans are interesting and varied. After 17 years with the County, Karl Roth is returning to his 186-acre farm in Indiana, a farm that has been in the Roth family for over a hundred years. Today it produces wheat, corn, and soybeans. Thoroughly acclimated to Southern California, Mr. Roth



New Arboretum entrance.

Photo by William Aplin

will wait until the end of winter before returning to the rigors of the Midwest. Gertrude Woods is looking forward to "freedom from clocks and calendars" and plans to weigh and consider at her leisure a number of options in the teaching and teacher-training fields. Glenn Hiatt expects to catch up on a number of fallow projects which he describes as photographic, piscatorial, and horticultural. Jess Tomory, who has been with the Department for nearly 18 years, says that his plans are indefinite, but that some extensive travel is likely. Mark Anthony has the immediate goal of visiting all the public botanic gardens in the country this coming spring, ending at Churchill Downs in time for the Kentucky Derby. Henry Noerdlinger will retire to his home in Irvine where, as befitting a lifelong bibliophile, he is already a member of the U.S. Friends of the Library. He expects to continue his periodic trips to Mexico to collect bromeliads and orchids, and will continue to donate to the Department specimens of special interest.

NEW ARBORETUM ENTRANCE

FOR MANY years, the steps leading up to the rotunda of the Arboretum were the unused, if inviting, entry to the garden. Local residents who were steady visitors were accustomed to entering through the turnstiles alongside the gatehouse. But first-timers would tend to automatically walk up the steps only to find locked gates and a cul-de-sac requiring that they walk back down again. Now, those steps are being used as originally intended, facilitated by a gently rising ramp alongside. Midway up is the new Information Center which will function the same as the old gatehouse, now serving as headquarters for Las Voluntarias. The change will bring visitors immediately into key areas — the Demonstration Home Gardens, the Garden For All Seasons, the Juniper Garden, and, directly off the rotunda, the library and administration offices. One other innovation is the use of electric-eye counters instead of turnstiles.

CAPITAL PROJECTS

EACH YEAR at budget time the directors of the 56 departments that provide the citizens of Los Angeles County with most of the services common to urban life, submit for the approval of the Board of Supervisors a list of capital projects they deem necessary for the effective operation of their department. Approval is based on such factors as size and relative importance of the department, the persuasiveness of the director, and the amount of money in the County budget allocated to the capital projects category. Inevitably, a priorities list is developed, usually so long that directors frequently submit the same request five years running without gaining approval. Because of limited funds capital projects, which are separate from department annual operating budgets, are not easily implemented, however well justified.

This Department is fortunate in having done well this year in this area. The Board has approved funding for a new administration center to be constructed at South Coast Botanic Garden. Still to come are final plans and the bidding and awarding of a contract. Residents of the South Bay area, members of the SCBG Foundation, and garden employees are, however, a big step closer to realizing a building complex that will include an auditorium, meeting rooms, offices, space for youth and adult education classes, and a new entryway.

Another approved project at South Coast calls for the completion of a grid system, similar to one existing at the Arboretum, that will make possible the easy location of plantings.

At Descanso Gardens, approval has been given for demonstration gardens including a nightlighting system that will assure the continuance of the biennial Festival of Lights and Fountains, a month-long event that always attracts thousands of visitors. The cost to exhibitors of setting up a basic lighting system each time had become prohibitive.

The Arboretum has received approval for the development of a new entranceway including the construction of a new roadway, parking, fountain and landscape lighting. Already completed by County engineers are plans for a new tropical greenhouse to be built just west of the present orchid houses. Construction will begin as soon as final plans are approved and bids awarded.

CHRISTMAS

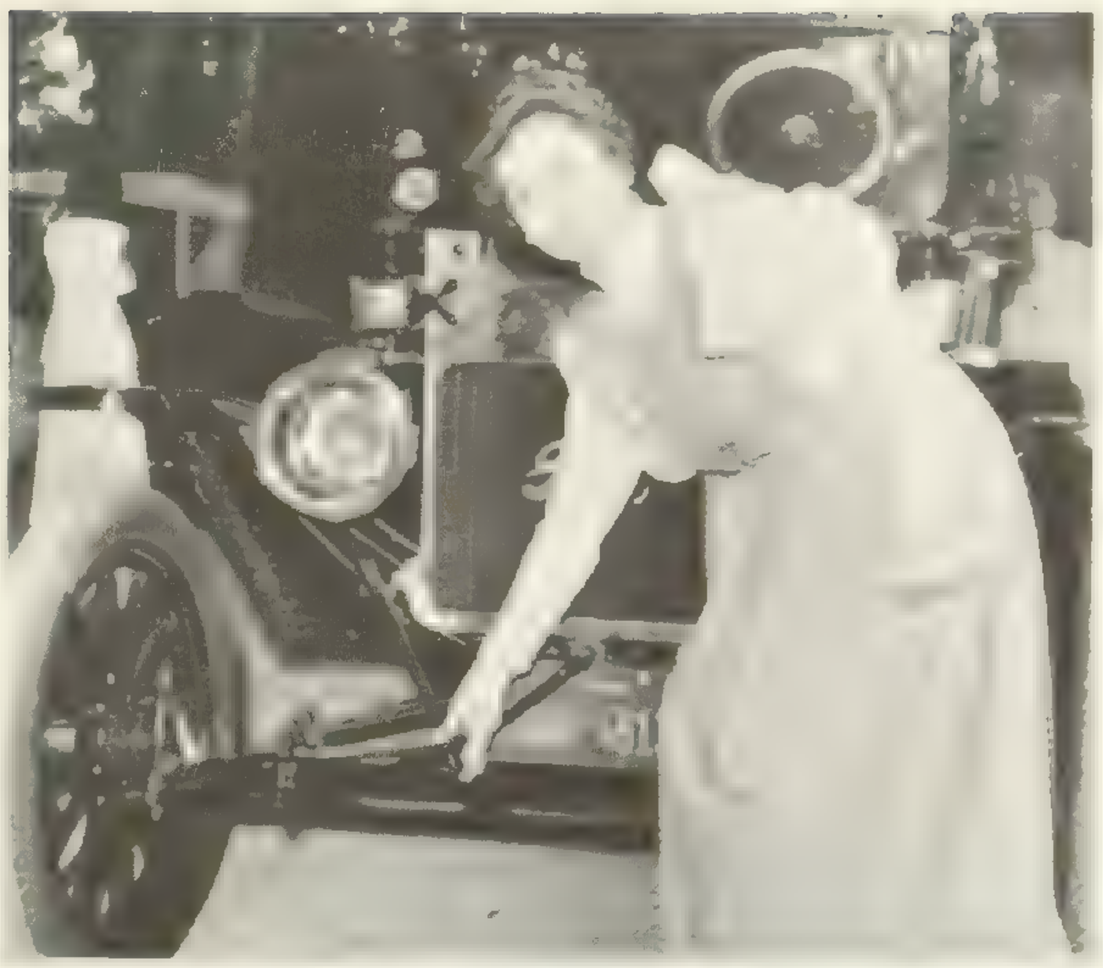
THE DESCANSO GARDENS Guild presented its annual exhibit of Christmas decorations in the Hospitality House during the first nine days of December, leaving thousands of visitors plenty of time to buy, cut out, weave or otherwise create some of the items they saw at the show. The range was wide. There were table settings, wall hangings, uniquely decorated live trees, wreathes of all kinds, children's doll houses, and Christmas scenes and objects typical of other countries.

Over at the Los Angeles State and County Arboretum, Christmas will be observed more modestly. The Queen Anne Cottage, Hugo Reid Adobe, and Santa Anita Depot will be decorated in keeping with the period these historic buildings represent. The decorations will be on view from December 18 through January 6.

AYRES AWARD

OVER 900 delegates to the International Shade Tree Conference met in Boston last August to discuss such subjects as the Federal Environmental Pesticide Control Act, whether or not trees should be planted along city streets, and the state of commercial arboriculture. Awards

were presented during the annual banquet on the last evening, among them an honorary membership to Dr. Samuel Ayres, Jr., in recognition of his pioneering work in introducing many flowering trees to Southern California through the Los Angeles State and County Arboretum which, of course, came into being 25 years ago chiefly through his efforts.



Alice Coulombe, Queen Anne Frolic chairman.

Historical curator Patricia Warren and page-turner Carol Brayshaw, chairman of history volunteers, at century-old piano in Queen Anne Cottage.

Vintage cars and vintage costumes silhouetted against Queen Anne Cottage.

QUEEN ANNE FROLIC

PROVIDENCE SHINES on worthy enterprises. At least it did on the Queen Anne Frolic last September 28th when 900 guests began to arrive at the Arboretum around 6 o'clock in the evening. The weather was pleasantly warm, there was nearly a full moon. For most of the month it had been gray, windy, and definitely on the cool side. A few days before the event a 90° hot spell arrived; a few days after it left, the Frolic happily sandwiched in between. It would be impossible to single out a highlight during the evening. Frolic chairman Alice Coulombe, the Board of Trustees of the California Arboretum Foundation, Mrs. Coulombe's Las Voluntarias colleagues, the Foundation business staff, and the Arboretum staff worked together to produce an excellent, beautifully served dinner, tours of the historical buildings, tours of the grounds by trams and by vintage cars from the California Horseless Carriage Association, music for dancing by the dixieland band of Dexter Jones and the string band of Bruce Dustman, and a special presentation by the Arcadia Chapter of the Society for Preservation and Encouragement of Barber Shop Quartet Singing in America. It was, of course, a fund-raising as well as fun-having affair and the results were happy in this category too—net profit was over $4800.

GARDEN KITCHEN

TAKE a kitchen in a stately, 35-year-old mansion, remodel it according to the ideas of a group of energetic garden-lovers, and end up, if all goes well, with a contemporary version of the old farmhouse kitchen, remembered for its warmth, its island tables, windowsill herb pots, and lots of counter space. This is what the Descanso Gardens Guild did with the kitchen in the home newspaper publisher Manchester Boddy built for himself, high on a scenic ledge, following his purchase of the 165-acre site of Descanso Gardens in 1937. As the Gardens' Hospitality House, the home has since become the scene of art exhibits, education classes, and innumerable luncheon meetings by garden clubs from all around the area. The new kitchen, replete with all the latest appliances, will facilitate the preparation of luncheons and other affairs at which good cooking is at a premium. It will also serve as a demonstration of how kitchen herbs and other plants, grown in hanging containers and in built-in, counter-top planters, can brighten and aid the work that goes into the daily routine of preparing meals. The Guild is so pleased with its project that it has created a crew of kitchen docents who conduct public tours every afternoon of the week from 1 to 4 p.m.

UPCOMING —

BALDWIN BONANZA IV will be presented by the California Arboretum Foundation next April 7, a Sunday. Chairman Mrs. Vance Gerry of Las Voluntarias reports that although details are not available at this time, this Bonanza will have a greater concentration on plants. There will still be sections on crafts and hanging baskets, always very popular with the gardening public. The event will be staged in the Demonstration Home Gardens and a special preview held the night before.

A home gardening and horticultural field day, subtitled "Spring Extravaganza," will be presented by the Arboretum and the California Arboretum Foundation next May 18 and 19. Designed to bring the public into close contact with the work of nine major plant societies and the propagation, public services, education, and research centers of the Arboretum, the event will provide the home gardener with just about everything he wants to know in a concentrated two days. The art of bonsai and the techniques of container gardening will be demonstrated in the Demonstration Home Gardens, the plant societies will exhibit their specialties either in the lecture hall, greenhouses, or Garden For All Seasons, and a special information center will cover such basic subjects as plant identification, fertilizers, pest and weed control, plants for fire retardance and erosion control, plant selection and ground covers.

Plants to Look For

Frank Simerly

THE GENUS *Acacia*, a member of the legume or pea family, comprises a large group of shrubs and trees mostly from the tropics or warm temperature regions. It has been estimated that there are more than 500 species of this genus, over fifty percent of them from Australia. The Los Angeles State and County Arboretum has 124 species and 11 varieties of acacia, the largest collection in the United States. Acacia leaves are usually bipinnate, but frequently the leaf-like structure that we observe is actually a leaf stem, or peticle, that has assumed the shape and activity of a leaf, and is called a phyllodia. Flowers are mostly yellow and generally appear in the late winter and early spring.

Acacias found their way into California about the same time as the gold rush, more than one hundred years ago. Since that time, they have come to be one of the most valuable ornamental plants in the California landscape. They can be found in beach plantings, growing on hillsides, and along our freeways, in addition to the multitude of uses they have in the home garden and in park landscapes. It would be impossible in a short article to mention all of the acacia species and varieties that can be seen in the Los Angeles County area, or especially the numerous ones found at the Arboretum. However, here are some species to look for.

The most common of the acacias seen in the California area is *Acacia baileyana* which is prized for its blue-gray foliage and yellow clusters of flowers that appear profusely in January and February. It is a prominent plant in all of our facilities. *Acacia longifolia* is frequently seen in freeway and home plantings and is a large rounded shrub that blooms in early summer.

On your visits this spring to the Arboretum, Descanso Gardens, and South Coast Botanic Gardens, we suggest you look for some of the more unusual acacias. For example, all three facilities have excellent specimens of *Acacia pendula.* It is a weeping acacia that has an interesting structural form and a graceful character that makes it attractive to all who see it. Its mature height is about 25 feet, foliage is a blue-gray with leaves to four inches long. It blooms erratically with small yellow flowers in pairs or clusters that appear usually in April or May. The flowers are not, however, the redeeming feature of this plant; it is its graceful weeping habit that makes it so attractive. There is a fine mature specimen of *A. pendula* in the Rose Garden at Descanso Gardens. Several small, but well-formed specimens can be seen at South Coast Botanic Garden just a short walk from the tram waiting area. And at the Arboretum there are specimens in various locations. A handsome one is on the walk approaching the Demonstration

Acacia cardiophylla

This specimen in the Australian Section of the Arboretum was planted in November, 1955, from seed brought from New South Wales by Dr. Samuel Ayres, Jr. The species was introduced to the nursery trade by the Arboretum in 1961.

A. cardiophylla

Photos by William Aplin

ACACIA SPECIES RECOMMENDED BY ARBORETUM HORTICULTURISTS

SPECIES	GROWTH	LEAVES	FLOWERS	USE
A. armata	Shrub 10 to 12′	Small, light green	Few, single, Feb.-Mar.	Thorny branches, good barrier.
A. baileyana	Tree 30′	Finely cut, blue-gray	Profuse, fragrant, Jan.-Feb.	Garden landscape and street tree
A. baileyana 'Purpurea'	Tree 30′	Finely cut, lavender-gray	Profuse, fragrant	Garden landscape and street tree
A. cardiophylla	Shrub 10′	Fern-like, small	Numerous, small yellow flowers in spring	Long arching branches.
A. cultriformis	Shrub 15′	Small gray	Clusters, March	Screen or on banks.
A. cyanophylla	Tree or shrub 30′	Long, narrow, blue-gray	Profuse, dark yellow. Mar.	Home garden or on banks.
A. cyclops	Shrub 20′	Narrow, dark green	Small inconspicuous in Mar.-Apr.	Screen, graceful foliage.
A. dealbata	Tree 50′	Feathery, silver-gray	Fragrant clusters, Feb.-Mar.	Hardy, fast grower.
A. dentata	Shrub 6′	Small, tooth-shaped	Profuse, Jan.-Feb.	Low hedge.
A. elata	Tree 80′	Long, dark green	Clusters. Spring	Fast growing.
A. farnesiana	Tree 20′	Fine, deciduous	Fragrant, Jan.-Apr.	Thorny, good in desert.
A. florabunda (retinoides)	Tree or Shrub 20′	Large, light green	Small clusters, unpredictable time.	Good screen.
A. glandulicarpa	Shrub 8′	Small, green	Fragrant, very profuse in Mar.-Apr.	Compact, good in home garden.
A. longifolia	Large Shrub to 20′	Long, bright green	Profuse in summer.	Fast, tolerant of moist conditions. Good screen.
A. pendula	Tree 25′	Weeping branches, gray foliage	Erratic flowering.	Graceful, weeping habit. Excellent.
A. podalyriaefolia	Tree 20′	Silver-gray	Numerous, Mar.-Apr.	Fine for home garden.
A. saligna	Tree 20′	Long, dark green	Profuse, March	Fast growth, nice weeping habit.
A. subprosa	Tree 25′	Soft green	Moderate bloom, Jan.-Apr.	Excellent. Weeping habit.
A. verticillata	Shrub 15′	Dark green, needle-like	Small spikes, Apr.-May.	Low screen, good at coast.
A. vestita	Shrub 6′	Bluish, grayish-green	Rich yellow, lemon color	Rounded, well-filled shrub.

Home Gardens. There are two fine young specimens that are an integral part of the Aquatic Gardens on top of Tallac Knoll, and other plants of this species can be found in the Australian section of the Arboretum. *A. pendula* does not seed readily and consequently is not found as frequently in the trade as it should be. However, it is a favorite with landscape architects and with plantsmen who are familiar with its habits.

Another beautiful acacia species that the Arboretum highly recommends is *A. podalyriaefolia,* commonly called the 'Pearl Acacia.' Also a small tree achieving a maximum height of something like 20 feet at maturity, it has a rounded head, the foliage is again a silvery-gray, soft and lovely to the touch as well as to look upon. The flowers are large, fluffy, and a very clear light yellow born in far greater numbers than on *A. pendula. A. podalyriaefolia* could be a large shrub as well as a small tree and is desirable because it is one of the earlier acacias to come into flower, sometime beginning as early as December depending on the area and climate. The oldest planting of *A. podalyriaefolia* at the Arboretum was in the extreme northwest corner of the Australian section. These trees recently died, but because it is such a desirable species young plants have been planted next to the tram road in the north central part of the Australian section. *A. podalyriaefolia* can also be seen at the South Coast Botanic Garden but does not seem to perform quite as well in the coastal influence. It is located on the west side of the garden there. In the same location you can see the finest specimen of *A. pendula* that South Coast has to offer. Close by the *A. pendula* which is just west of the center of the lake is another species that is most unusual, *A. subprosa.* It is a 25-foot-high tree that flowers in January and on through April with creamy yellow flowers. It has a weeping habit and extremely soft green foliage. The foliage is the attractive feature of the plant. It is a multiple trunk tree that is worthy of your attention.

One other acacia that you should look for this spring is *A. cardiophylla.* This acacia was introduced by the Arboretum in 1961 and is an excellent plant for banks and screens. It should be a valuable asset to freeway planters. It grows 12 to 14 feet in height and almost the same width, branching right down to the ground making extremely dense and handsome screens. Flowers may appear anywhere from January through April. You may find this Arboretum introduction growing as a screen along the Flood Control Channel at the western edge of the Australian/South African sections, and also growing as a screen around a portion of the nursery area.

It is unfortunate that with the literally hundreds of handsome acacia species that exist, the nursery industry lists only three or four on the average. If a person is really interested in seeking out unusual acacia species in nurseries, perhaps ten or twelve may be located. When you visit the Arboretum or the other Department gardens to see the acacias, you'll be surprised to find many not mentioned in this article that are truly outstanding horticultural specimens, and one wonders why they are not available. Perhaps one point that influences the availability is the fact that nearly all acacias are relatively short lived. By this we mean that they may live for only twenty or thirty years; however, they compensate for this feature by being generally very rapidly growing plants. So, for example, *A. podalyriaefolia* may grow in three or four years to a mature size. This would certainly compensate for its short life span.

Frank Simerly, Arboretum superintendent is a regular contributor to Lasca Leaves.

Callistemons as Landscape Subjects in Southern California

Carlos D. Jativa

Several species of the genus *Callistemon* R. Br., commonly known as bottlebrush, are found as well established landscape subjects in the Southland. This genus is comprised of 34 species of plants native to Australia, Tasmania, and New Caledonia. Some Australian and Tasmanian species have been cultivated in California for about a century. But in spite of their popularity these ornamentals are often poorly identified not only in the nursery trade but also in parks and even in botanic gardens.

Although at first glance all bottlebrushes seem to look alike, a closer analysis of their morphological details would reveal the subtle differences between the species in this genus. Yet, in spite of their diversity all these plants share the same type of inflorescence so reminiscent of the utensil known as a bottlebrush. The bottlebrush type of inflorescence, however, is not unique to these species alone for it is also found in the genus *Melaleuca L., Kunzea Reichb.,* and others in the family *Myrtaceae,* and even in unrelated genera belonging to the family *Proteaceae* such as the banksias, proteas, leucospermums, etc. This means that a plant with a bottle brush type of inflorescence is not necessarily a bottlebrush. Some authors prefer to confine this vernacular name to the genus *Callistemon* alone, a point of view shared in this article.

Bottlebrushes are shrubs or small trees with alternate and almost sessile leaves which vary in shape all the way from gritty and needle-like to smooth and broad. The brushes themselves are formed by sessile flowers which are spirally arranged along the stem axis forming either loose or dense cylindrical spikes. Inflorescence and leaves alternate along the stem giving the characteristic appearance of the bottlebrush (Fig. 1). The sessile fruits remain attached to the stem for many years and do not release the minute brown seeds shortly after flowering, as is the case in most of the flowering plants, but retain them for several years. The most conspicuous part of a flowering bottlebrush is formed by the male sex organs (technically known as stamens). The fllaments of these organs, in the great majority of the species, are elongated and quite distinct. This characteristic has been used to differentiate this genus from its closest relative *Melaleuca.* In the latter genus a bundle of filaments is found opposite each of the five petals. It should be pointed out, however, that there are at least two species of *Callistemon* in which the stamens are definitely united into bundles. One of them is the popular weeping bottlebrush and the other, with a great potential for the nursery trade, is the showy or Albany bottlebrush.

Culture

Bottlebrushes are well adapted to California's climate which is not very different from the climate found in their native habitat. These ornamentals prefer to be in a sunny site and require minimal care after they are established. These qualities make *Callistemon* a most desirable economical subject for street tree planting programs in California. Callistemons can withstand severe pruning, a feature which

Fig. 1. Close-up of the inflorescence of C. 'Jeffers' illustrating the similarities between the bottlebrush type of inflorescence and the utensil known as a bottle brush. This picture was taken near the Figueroa entrance to the old County Court House in Santa Barbara.

Fig. 2. Standards of C. citrinus var. splendens Stapf planted as street trees along **Huntington Drive, South Pasadena.**

Fig. 3. A magnificent specimen of C. viminalis used as a very effective shade tree at 8908 Twelfth Avenue, Inglewood. The tree is about 40 feet tall and has a spread of 40 feet.

Fig. 3a. A rather interesting use of a young specimen of C. viminalis in a raised bed next to the sidewalk. Its graceful bonsai-like appearance harmoniously blends with its surroundings.

makes them ideal for shaping or training as standards, espaliers, and topiary subjects.

Bottlebrushes are very easy to propagate from seeds and stem cutings. Propagation from seeds is recommended when a lot of variation is desired, since by this means new forms or hybrids can be obtained from open pollinated flowers. When working toward a specific desirable combination of characters, however, it is required that the flowers used as the male parental line be bagged before the anthers release their golden pollen grains. This is done to avoid mixtures of pollen grains from other bottlebrushes. The flowers from the female parental line should be emasculated (cut off the stamens) before their anthers release the pollen grains. Immediately after pollination (putting the pollen grains from the male parent plant on the stigma of the female parent flowers) the inflorescence is covered with a bag to prevent the insects and humming birds from bringing in pollen from other flowers. The seeds can be sown in a moist planting medium such as vermiculite where they will germinate in about 6 to 17 days, depending on the species. Propagation from cuttings is mandatory when exact replicas from a given plant are desired. When using this method the following procedure is done: Select healthy stem tips about 3 to 6 inches long containing semihard or hard wood, and sever them with a sharp knife just below the point where the leaf is attached to the stem. Dust the cut end with any commercially available rooting hormone and insert it in a 50:50 moist mixture of medium grade perlite and peat moss. Keep the cuttings moist at all times by intermittent mist sprays. Rooting will usually occur within one to two months after treatment.

Landscape Uses

The following bottlebrushes have proven worthy of cultivation in California. They are listed in decreasing order of popularity.

1. Lemon bottlebrush *(C. citrinus* (Curtis) Skeels)

This species is planted throughout California. It makes a 10-to-15-foot-tall shrub or small tree with lemon-scented leaves and crimson brushes. The lemon bottlebrush is quite versatile as a landscape subject. It is commonly seen as a screening shrub along freeways and as a formal hedge in private gardens. It is also common as a standard in front yards and as a street tree in parkways and traffic islands (Fig. 2). The nursery stock known as improved *C. lanceolatus* is taxonomically known as *C. citrinus* var. *splendens* Stapf.

2. Weeping bottlebrush *(C. viminalis* (Soland. ex gaertn.) Cheel*)* (Figs. 3, 3a, and 3b).

The weeping bottlebrush makes a tree to 40 feet tall, but more often it is seen as a smaller standard in front yards and in parkways. The most obvious characteristics of the weeping bottlebrush are the long drooping branches, the reticulated bark pattern and the red stamens falling off from the flower as a single unit. The nursery stocks known as *C. cupressifolius, C. 'Dwarf', C. citrinus* 'McCaskillii', C. McCaskillii, and 'Captain Cook belong to this species.

3. Stiff-leaved bottlebrush *(C. rigidus* R. Br.*)*

This species is characterized by its long arching branches which give the plant a natural umbrella-like appearance (Fig 4). It is common as an accent shrub in front yards and as a screening shrub in group planting. It flowers in spring and in fall.

4. Willow bottlebrush *(C. salignus* (Smith) D.C.*)*

The most remarkable characteristics of this bottlebrush are the spongy papery bark, the willow-like branches and the pink young growth. This species is well

Fig. 3b. Standards of C. viminalis used to screen a shopping center parking lot, Grand Avenue. Covina.

Fig. 4. An outstanding dome-shaped old specimen of C. rigidus used as a street tree on Old Mill Rd. between Monterey Blvd. and Huntington Dr., San Marino.

Fig. 5. Group plantings of C. linearis on the left side of the ramp connecting Olympic Boulevard and Avenue of the Stars in Century City.

adapted to both swampy areas and to well drained hillsides. As a landscape subject it is mainly used as a shade tree in front yards.

5. Narrowleaf bottlebrush *(C. linearis* (Smith) DC.*)*

This species at first glance would appear to be indistinguishable from *C. rigidus*. But it differs from the latter in having an erect spreading habit and leaves which are U-shaped in cross section and have obscure veins. This bottlebrush is usually found in group plantings (Fig. 5). It is also found as an accent shrub in front yards and as a screening shrub in parking lot landscaping. In addition it is also found as a single specimen in front yards.

6. *Callistemon 'Jeffers'*. Also known in the nursery trade as *C. 'Jeffersii'* and as purple bottlebrush.

The nursery stock sold under this name can be recognized by its reddish purple filaments, its scaly bark and its grayish-green flat foliage (Fig. 1). This bottlebrush has been reported to be of hybrid origin. It is usually found in group plantings forming screens. It is also found as a street tree standard.

7. Scarlet bottlebrush *(C. macropunctatus* (Dum. - Cours.) Court).

The most outstanding characteristics of this bottlebrush are its ascending-spreading much entangled and sometimes arching branches, its thick and flat gritty leaves, and its roseine-purple filaments which are tipped with greenish-yellow anthers. This species used to be known in the nursery trade as in the technical literature as *C. rugulosus,* including several varieties, and as *C. Coccineus,* also including several varieties. It is found as a landscape subject in group plantings forming hedges and screens.

8. Prickly bottlebrush *(C. brachyandrus* Lindley*)*.

This is one of the most lovely and graceful of the bottlebrushes. It is characterized by its very short clear red filaments (less than one cm. long) tipped with greenish-yellow anthers and by its grayish-green needle-like foliage. This species is well adapted to desert or semi-desert conditions. It is mainly used in group plantings as a screening shrub in parking lot landscaping and as an accent shrub in private gardens.

The aforementioned bottlebrushes are well established landscape subjects in Southern California. Other promising taxa, however, can be found in parks (especially in Santa Barbara), in botanic gardens, and on university campuses throughout California. A collection of over twenty different species of bottlebrushes can be found on the grounds of the Los Angeles State and County Arboretum in Arcadia. Two bottlebrushes from this collection are now under contract with local nurseries to be introduced in the near future. One of them is a reported sibling of *C. 'Jeffers'* called *C. 'Rosea'* and the other is *C. pachyphyllus* Cheel var. *viridis* Cheel (See Cover). *C. 'Rosea'* is very much like *C. 'Jeffers'* but the filaments of the former have more pink when young obtaining a bluish cast at maturity. *C. 'Rosea'* can be used as a screening shrub or as a hedge. *C. pachyphyllus* var. *viridis* characterized by its yellow-apple-green filaments and its smooth narrow leaves. This variety could be confused with the green-flowered *C. pinifolius* (Wendl.) DC., but the latter has narrower needle-like gritty leaves. Its role as a screening shrub is outstanding.

Carlos D. Jativa, an assistant biologist in the Department's research division, is currently engaged in a taxonomic and horticultural study of the cultivated Callistemon.

KOELREUTERIA

George Spalding

Would you like a tree that provides a light filtered shade in summer and lets the sun through in winter? One that is not troubled by disease or insect pests? One that is not messy except briefly in the fall when the leaves drop and then usually blow away. If you do, maybe one of the koelreuterias is your tree. They are not fussy about soil as long as drainage is good, and they grow best in full sun.

Koelreuteria is a small genus of deciduous trees native to southeastern China and Formosa, with one or two species in the Fiji Islands. It was named in honor of Joseph G. Koelreuter (1733-1806), professor of natural history at Karlsruhe, Germany.

Three of the eight or so species are available to southern California gardeners. *Kolreuteria paniculata,* the Golden Rain Tree, (not to be confused with Laburnum vossi, the Golden Chain Tree which does not grow well in this area) comes from southwestern China. In its native habitat it can reach a height of 40 feet with an equal spread. However, it is usually not over 20 to 30 feet tall in southern California with a slightly larger spread. *K. henryi* is usually sold in nurseries as *K. bipinnata* and it is found under this name in much of the literature. This species is slightly taller than *K. paniculata.* but the differences are chiefly botanical. For example, *K. paniculata* has dark brown bark, notched leaflets, and pointed fruit capsules, while *K. henryi* has dark gray bark, leaflets not notched, and rounded fruit caspules. Both these species are listed in the catalogs of several wholesale growers so should be readily available. The third available species, *K. integrifoliola,* was introduced by the Arboretum in 1958. It has grown for a year or two in one wholesale nursery but is only available from the Arboretum at this time.

K. paniculata var. *apiculata*

All of the koelreuterias are round-headed trees with compound leaves com-

posed of 7 to 15 leaflets. The leaflets of two of the species *(K. paniculata* and *K. henryi)* are serrated; those of *K. integrifoliola* are entire. The whole leaf is often 1 to 1½ feet long. In July or August the trees are covered with large terminal panicles of small yellow flowers. While the individual flowers are small the flower heads are large and showy. These are followed by bladder-like seed pods which somewhat resemble inverted Japanese lanterns. They are light green when young in *K. paniculata* and *K. henryi,* and deep rose pink on *K. integrifoliola.* As the fruit matures it turns brown on the first two and becomes a much lighter pink on the third.

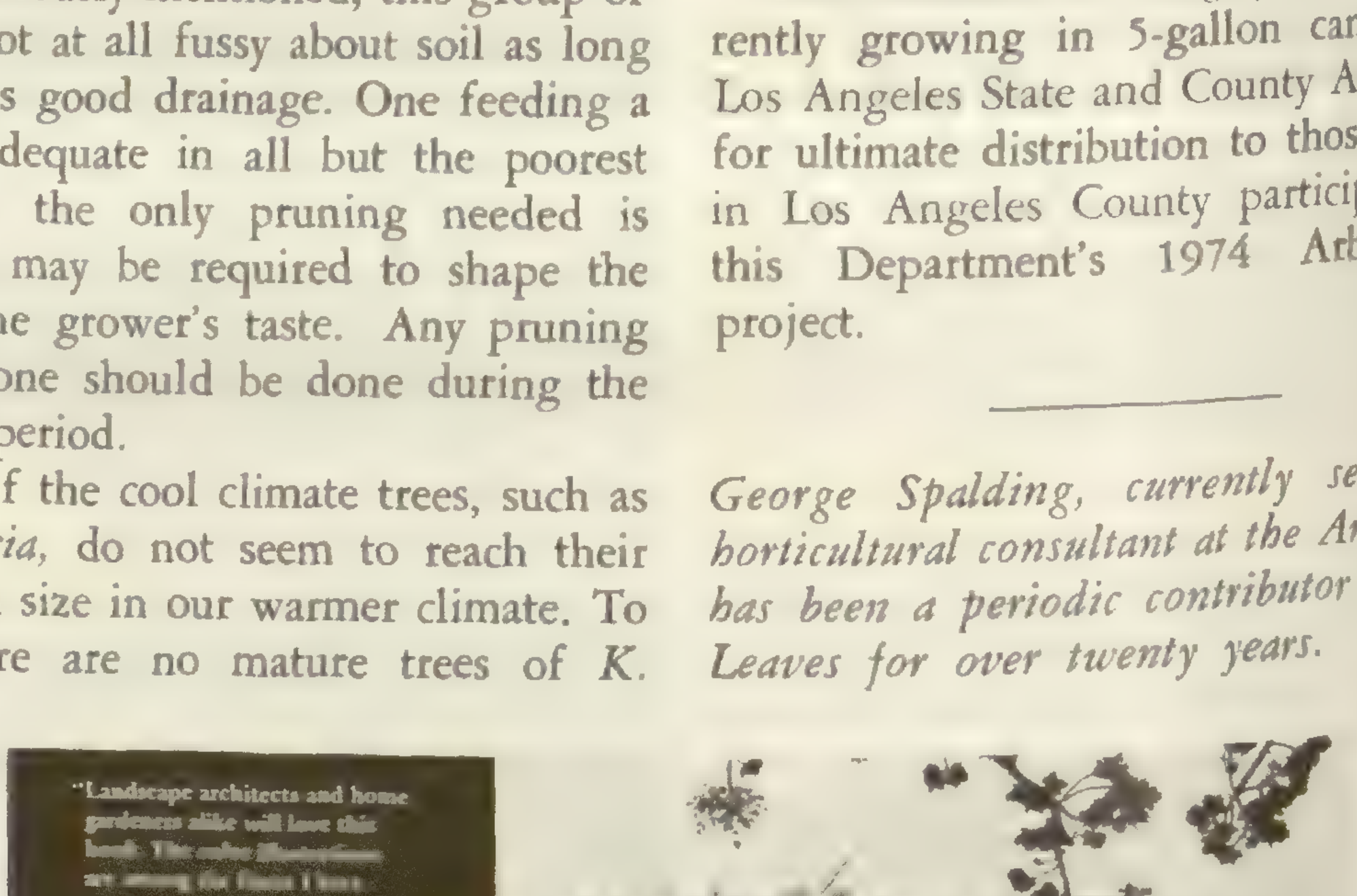
As previously mentioned, this group of trees is not at all fussy about soil as long as there is good drainage. One feeding a year is adequate in all but the poorest soils and the only pruning needed is whatever may be required to shape the tree to the grower's taste. Any pruning that is done should be done during the dormant period.

Most of the cool climate trees, such as *koelreuteria,* do not seem to reach their maximum size in our warmer climate. To date, there are no mature trees of *K. integrifoliola* at the Arboretum; the oldest one is about twenty years old so the ultimate height here is still unknown. It can be said that *K. integrifoliola* has the most colorful seed pods of the three, is more upright in growth, and appears to be as easily grown as the other two.

The *koelreuterias* belong to the soapberry family, Sapindaceae. This is a family of about 125 genera, mostly trees, which is spread throughout the tropical regions of both hemispheres. Other members of this family which are very well known in southern California are the carrotwood tree, *(Cupaniopsis amacardioides),* and the hop bush *(Dodonaea viscosa).*

One thousand *K. integrifoliola* are currently growing in 5-gallon cans at the Los Angeles State and County Arboretum for ultimate distribution to those schools in Los Angeles County participating in this Department's 1974 Arbor Day project.

George Spalding, currently serving as horticultural consultant at the Arboretum, has been a periodic contributor to Lasca Leaves for over twenty years.



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Color for the landscape

A compilation of the most spectacular flowering plants for year-round color in sub-tropical climates

White and purple South African Trailing Daisies (**Osteospermum fruticosum**), and yellow Cape Weed (**Arctotheca calendula**) at Baldwin Avenue and Interstate 210 in Arcadia.

A few years ago, these colorful ground covers were rarely seen in Southern California. Today, they are widely planted along freeway approaches, at freeway intersections, and in other public areas where color, low maintenance, erosion control and hardiness are important considerations. They come to us from South Africa through the plant introduction program of the Los Angeles State and County Arboretum.

Ever since the Arboretum was formed — this year is its 25th anniversary — the introduction of useful, ornamental plants has been one of its principal community services. So far, 60 new ground covers, shrubs, and flowering trees have helped to beautify the Southern California urban landscape. More are coming.

SCE

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BOOKSHELF

GARDENING FOR GOOD EATING by Helen M. Fox; Collier Books, New York.

Recently re-published in a paperback edition, this book was written for the "victory gardeners" of World War II to help augment the food supply during wartime. It is just as up-to-date and needed now as then. Mrs. Fox is the author of many books on gardens, gardening and herbs. All of her advice comes from years of study, research, and practical experience in the growing of every vegetable and plant mentioned. The practical teachings offered with such enthusiasm will stimulate all readers to want to go out into the garden and grow their own crops, rush the harvest to the kitchen and personally cook and eat it at its perfection. The usual necessary facts of gardening are all here—soil care, seeding and planting, and what to do about pests and other troubles. In addition, all the usual and unusual vegetables are described and discussed as to culture, harvest, storing and uses. There are also chapters on herbs, teas, fruits and some wild edible plants. All this plus recipes is presented in a pleasant, happy style that mirrors the author's joy in the growing of her vegetables and all plants. "Gardening For Good Eating" is well worth reading by both experienced vegetable gardeners and the fast expanding group of novices.

THE YEARS IN MY HERB GARDEN by Helen M. Fox; Collier Books, New York.

Ten years after writing "Gardening Gor Good Eating" Mrs. Fox published a delightful collection of easy-to-read essays on her many years of experience in the growing and collecting of herbs. Incidentally, she states clearly that she does not drop her "haitches!" She prefers to pronounce the "h" in herb as has been done in England since the nineteenth century. The book is not meant to be a complete herbal by any means. It is really practical advice on the cultivation and uses of the major herbs suitable for American gardens. Written from the point of view of the horticulturist and landscape gardener, with a dash of botany to aid in the descriptions of the plants, it gives clear growing and maintenance instructions for each plant mentioned. Mrs. Fox is honorary president-at-large of the Herb Society of America and is known as an authority on garden design, herb lore, culinary and medicinal uses of herbs. Yet there is only the most casual mention of Old World uses and folklore in this book. Emphasis is on the best way of growing herbs. Plants do not change from year to year and neither do their responses to good care and proper culture. So the advice presented by the author is as applicable today as it ever was. This paperback reprint will be of value to the amateur herb grower.

—Diane Martin

PRINCIPLES OF TURFGRASS CULTURE, John H. Madison, Van Nostrand Reinhold, N.Y. 1971. 420 p. Black and white illustrations.

FUN WITH TERRARIUM GARDENING, Virginia and George A. Elbert, Crown, N.Y. 1973. 144 p. Black and white and color photographs.

BIOLOGICAL CONTROL, Proceedings of an AAAS symposium, edited by C. B. Huffaker, Plenum Press, N.Y. 1971. 511 p.

PLANT PHOTOSYNTHETIC PRODUCTION, Manual of Methods, edited by Z. Sestak, J. Catsky, and P. G. Jarvis, Junk, The Hague, The Hague. 1971. 818 p. Illustrations.

MUSHROOMS IN THEIR NATURAL HABITATS, Alexander H. Smith, Hafner Press, N.Y. 1949. 626 p. No illustrations.

CALLISTEMON PACHPHYLLUS CHEEL VAR. VIRIDIS CHEEL (COVER)

Callistemon pachyphyllus Cheel var. *viridis* Cheel, a future introduction by the Los Angeles State and County Arboretum, is a small upright shrub that invites use as a screen or specimen plant. At the Arboretum, specimens brought back from Australia 14 years ago by then superintendent, George Spalding, have reached a height of 5 feet and a spread of 6 feet. In its native habitat the plant is usually smaller. Edwin Cheel, a specialist in the genus, named this variety in 1925 from specimens he had been studying in the Melbourne Herbarium.

The leaves are smooth and alternate, either green or more often grayish-green, linear or slightly oblanceolate 3½ cm to 6½ cm long and 2½ mm to 6mm broad at maturity. The flowering spikes (brushes) are 4½ cm to 8 cm long and about 4 cm to 5 cm broad. The filaments are a yellowish apple-green in color.

Several hundred plants have been obtained from rooted cuttings. They are now at the one-gallon-can stage and will be available only to members of the California Arboretum Foundation at the annual meeting next May. This introduction appears to be as tolerant of diverse weather conditions as the more commonly used bottlebrushes, although not as rampant or vigorous. It will thrive best in a sunny location.

ARBORETUM WEATHER

Long. 34°08'48" N.
Lat. 118°02'59" N.
Elev. 571.28 ft.

Weather season:
Oct. 1 to Sept. 30

	Sept.	Oct.	Nov.
Average daily maximum temperature	86	86.8	77
Average daily minimum temperature	58	50.2	45.3
Highest temperature	104	100	88
Lowest temperature	53	47	36
Number of clear days	8	22	17
Number of partly cloudy days	20	7	11
Number of cloudy days	1	2	1
Rain during this month	0	0	1.88"
Total rain since Oct. 1st		0	1.88"

Calendar

January, February, March

January 11 — 8 p.m.
Theodore Payne Foundation Lecture "Solving Problems in the Preservation of California Native Species"
James Roof, director, Regional Parks Botanic Garden, Oakland

January 13 — 10 to 12 noon
Sunday Morning Garden Walk
"Australian Section"
Dr. Leonid Enari, senior biologist

January 19, 20 — 8 to 5 p.m.
Iris Show
Sponsored by the Southern California Iris Society*

January 26, 27 — 8 to 5 p.m.
Bonsai Show
Sponsored by the Baikoen Bonsai Kenkyukai Society*

February 3 — 2 p.m.
Sunday Afternoon Lecture
"Vegetable Gardening"
Tak Niiya, Arboretum education specialist
Sponsored by the California Arboretum Foundation

February 9, 10 — 8 to 5 p.m.
Camellia Show
Sponsored by Temple City Camellia Society*

February 10 — 10 to 12 noon
Sunday Morning Garden Walk
"Asiatic-North American Section"
Dr. Leonid Enari, senior biologist
Sponsored by the California Arboretum Foundation

March 3 — 10 to 12 noon
Sunday Morning Garden Walk
"Tallac Knoll-Aquatic Garden"
Frank Simerly, superintendent
Sponsored by the California Arboretum Foundation

March 15 — 8 p.m.
Theodore Payne Foundation Lecture
"How Plants Improve the Environmental Quality of the Earth"
Dr. Bonnie C. Templeton, former curator of botany, L.A. County Museum

March 17 — 2 p.m.
Sunday Afternoon Lecture
"Propagation"
Don Fitch, Arboretum nurseryman
Sponsored by the California Arboretum Foundation

March 30, 31 — 8 to 5 p.m.
Aril Show
Sponsored by Aril Society International*

March 31 — 10 to 12 noon
Sunday Morning Garden Walk
"Historical Buildings"
Patricia Warren, historical curator
Sponsored by the California Arboretum Foundation

April 7 — 8 to 5 p.m.
Bonanza IV
Sponsored by the California Arboretum Foundation

DESCANSO GARDENS, La Canada

January 9 — 10 to 1 p.m.
Lecture: "Easy Budget Meals"
Hospitality House
Sponsored by Descanso Gardens Guild

January 12 — 1:30 p.m.
Rose Pruning and Planting Demonstration
Descanso Gardens staff and other rosarians

February 10 — 10 to 12 noon
Sunday Morning Garden Walk
"Camellia Forest"
George Lewis, assistant superintendent

February 15 — 8 p.m.
Theodore Payne Foundation Lecture
"Indian Uses of California Natives"
Edith Cowper, ethnic scholar-lecturer

February 19 — 2 p.m.
Descanso Gardens Guild annual meeting and tea

February 23, 24 — 8 to 5 p.m.
Camellia Show
Sponsored by Camellia Council

March 23, 24 — 8 to 5 p.m.
Daffodil Show
Sponsored by Southern California Daffodil Society

April 7 — 10 to 12 noon
Sunday Morning Garden Walk
"Native Plants and Flowering Fruit Trees"
George Lewis, assistant superintendent

April 12 — 8 p.m.
Theodore Payne Foundation Lecture
"California Heritage of Wild Flowers"
Mrs. J. Roger Bentley, photographer-lecturer

SOUTH COTST BOTANIC GARDENS.

Palos Verdes Peninsula

March 10 — 10 to 12 noon
Sunday Morning Garden Walk
Armand Sarinana, superintendent

March 24 — 2 p.m.
Sunday Afternoon Lecture
"Container Gardening"
Edward Hartnagel, assistant superintendent

BIRDWALKS

DESCANSO GARDENS
2nd and 4th Sunday of each month at 8 a.m. Sponsored by San Fernando Audubon Society.

SOUTH COAST BOTANIC GARDEN.
Palos Verdes Peninsula
3rd Wednesday of each month at 8 a.m. Sponsored by South Bay Audubon Society.

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1974
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Tasca Leaves

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Grevillea nematophylla (Cover)

Grevillea nematophylla, or waterbush, as it is commonly known in its native Australia, is one of several species of the genus to be tested at the Los Angeles State and County Arboretum. Four have already been introduced to the nursery trade of Southern California. *G. nematophylla* has now proven itself to be well-adapted to its new habitat and, as a consequence, will be introduced to the public in the near future.

The species may be described as a drought-tolerant shrub or small tree having grayish-green, needle-like leaves, fragrant creamy-white flowers, and reddish-brown fruits. It may be grown as a potted plant, in which case it will do best in well-aerated, porous media such as coarse sand or perlite. In the garden, it will grow in ordinary soils that are adequately drained. The species is highly recommended for the desert and semi-desert areas of Southern California, but will also grow vigorously in chaparral and foothill coastal areas. Growth rate in the field is about one foot per year. Under optimum conditions, young plants may flower during their third year. Once they have begun to flower, they will bloom yearly; in Southern California from June through July.

Plants are propagated by sowing seed in a mixture of ⅓ peat moss mixed with ⅔ propagation grade #2 Sponge Rok. Germination takes place in 10 to 14 days at a minimum rate of 35%. To prevent loss from damping off, seedlings should be pricked off and moved outside as soon as possible.

G. nematophylla offers a number of esthetic and practical uses. It can be used as background shrubbery highlighted by the beautiful, ornamental flowers that emit a sweetish, somewhat fruity scent. It can serve as a screen for privacy and wind control. Its stiff, needle-like leaves can, at the same time, act as a deterrent to unwanted foot traffic.

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Lasca Leaves

Published quarterly by the California Arboretum Foundation, Inc., for the Department of Arboreta and Botanic Gardens of Los Angeles County.

LOS ANGELES STATE & COUNTY ARBORETUM | DESCANSO GARDENS | SOUTH COAST BOTANIC GARDEN

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Editor
Donald S. Dimond

Cover photo by Francis Ching

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department notes

GEORGE H. SPALDING

AT NINE o'clock every morning the telephone would start ringing in the small office at the rear of the Arboretum library building. It would signal the start of George Spalding's twice-a-day telephone service: two-hour periods in the morning and afternoon given over to taking calls from homeowners seeking guidance, advice, or just reassurance on the buying, planting, or care of a plant. This was George Spalding's daily routine for the past seven of his 25-year-association with the Arboretum. It was no wonder that to thousands of amateur and even some professional gardeners he was the Arboretum's familiar botanical information consultant, the person to call with the same confidence they would call "Information" or "Weather." And if the calls got stacked up, as they frequently did, people could come to see him personally, outside those morning and afternoon telephone hours. One reason the calls would get stacked up was because of George Spalding's personality. Always a plantsman, his concern that a horticultural or botanical question or problem be satisfactorily resolved would prompt him to pursue the matter beyond a yes or no response to whatever point he felt would leave the caller with the feeling of having found direction and resolution. To the serious gardener these are important considerations as George Spalding knew.

Two other facets of George Spalding's long career with the Arboretum were his contributions to this publication and his intimate knowledge of Arboretum history, knowledge that found expression in *A History of LASCA, The First Twenty-Five Years*, a book he completed early last year that was published just in time for the gala anniversary dinner of last February. That book and articles in the June and December issues of Lasca Leaves were the last he would write. George Spalding died on January 12, the result of a lung infection flaring up from a long history of respiratory ailment. His passing was hard to believe. It seemed unreal not to encounter his friendly, jovial figure around the grounds. Four days later a memorial service was held in the Arboretum lecture hall with members of the staff and many of his friends in attendance. It had been arranged with two close relatives: his sister, Mrs. Elliott Darrow, and his brother, Delman, both of whom had flown out from the East. The service began with a prayer by Dr. Holmes Ambrose of the local Church of the Shepherd, followed by a moment of silent prayer. Then, Dr. Ambrose sang a hymn that Mrs. Darrow had selected. Arboretum director, Francis Ching, followed with a few remarks and the reading of a poem. Dan Martel, staff plant recorder who had been hired by George Spalding 18 years earlier, played a cello solo in his memory. Two old friends and co-members of a longtime informal group of plantsmen called The Leaf Eaters, Elmer Lorenz and Philip Chandler, spoke fondly of their friend. Then, after a hymn and benediction by Dr. Holmes, the service ended. Mrs. Darrow and Delman Spalding adjourned to the Arboretum's Seminar Room where they met George's friends and co-workers. In unfamiliar surroundings, and under sad circumstances, they talked graciously with

George H. Spalding

each person and one could see and appreciate the effort they were making to help everyone carry the loss more easily.

George Spalding was a bachelor at the time of his death and it would be no unkindness to any of his friends to say that his closest companion was his dog, Maggie. Robert Erny, a part-time Arboretum tour guide who had shared his home for a period, and who had visited him in the hospital the night before he died, stayed at his apartment for a few days so the dog would not be uneasy. Maggie has now found a home with two of George's friends, Elmer and Hilda Sademan who works in the California Arboretum Foundation office. George would have been pleased with this arrangement.

Elmer J. Lorenz, one of George Spalding's oldest friends, gave the following eulogy at the memorial service on January 16.

"I consider it a real privilege and great honor to have been asked to participate in this memorial service for George. However, at a moment such as this, what does one say about such a close and treasured friendship as I had with George? How can I express the real feeling of loss? Words are merely utterances that we make—they are without emotion or feeling and cannot possibly express what one really feels within. I know that the few words I speak here today will fall far short of expressing the real friendship I had with George and its joy and meaning to me.

"We all knew George in different ways, some as members of his family, others as co-workers, those who had business dealings with him, and some as friends with mutual interests or just friends that George loved to chat with. So, no matter what our relationship with him was, we all had one thing in common and that was a great love and fondness for George, and we all treasured his friendship.

"Taking the Book of Time and thumbing back through the years to almost 23 years ago, I still can recall very vividly my first meeting with George in the pink house on Old Ranch Road that served as the office for the Arboretum. My wife and I had often heard and read about the 'new' Arboretum and decided one beautiful California spring day to visit it. At

this first meeting with George we learned that he was the director, horticulturist, propagator, publicity man and in charge of any other duty that might happen to come along at any given moment. After talking with George for a while about the new Arboretum, we tramped over the grounds of the still undeveloped area. It was then I first realized George's vast knowledge of plant materials and his great enthusiasm for the future of the Arboretum. He was vitally interested in the dual role the Arboretum should play in the botanical and horticultural world.

"As time passed, our bonds of friendship became stronger and I realized more and more that the Arboretum was much loved by George; it was a vital part of his whole being. He gave much of himself to these beautiful grounds. George has served more years than any other employee. Probably a great many people do not know that he planted many of the trees that now contribute to the beauty of the Arboretum grounds. George was widely respected as an authority in the horticultural world. His knowledge of varied plant materials and their requirements was constantly drawn upon by amateur and professional gardeners alike.

"George's horticultural background included training at the Stockbridge School of Agriculture and the New York Botanic Garden. His knowledge was further increased by his employment at the famous Wayside Gardens in Mentor, Ohio, and the well known, but no longer existing, Paul J. Howard's and Eastgate Nurseries. He served many years on the Board of Directors of the Southern California Horticultural Institute and was its president for two years. George was also active in the Iris and Geranium Societies. However, his favorite group was one called the 'Leaf Eaters'—a group of six who gather monthly at various member's homes for dinner and talking 'shop' — that's plants, of course!

"George contributed much to the horticultural world through his lectures and writings, his last being, 'A History of The Los Angeles State and County Arboretum—The First Twenty-Five Years.' He was frequently referred to as Mr. Arboretum.

"During World War II, George served with the Marines in China. While serving in China he adopted a small Chinese boy. After the war, George continued to send support for his 'son,' but during the years the communists took over China, George lost all contact and never heard from his 'son' again.

In later years, as illness began to envelop George, more and more he became less active with plants and was unable to attend meetings of large groups of people because of the danger of his contacting the respiratory infections and the danger to his lungs.

Stamp collecting, and particularly collecting Plants on Stamps, became an important activity in George's life. Collecting Plants on Stamps became a substitute for George's previous activities in the plant world. Although this new phase of gardening could not completely replace the old activity, it did help. George and I would go on plant hunting expeditions in various stamp stores looking for rarities. We pored over many an album looking for a new 'species.' Going over these countless books of stamps was like tramping over barren ground looking for a plant treasure. Every once in a while we would be rewarded by finding a real gem.

The years are racing on and while our memory may grow dim on many things, we will never forget the friendship of George H. Spalding and all he offered each of us.

And as the Book of Time closes, George, we won't say goodby, but just Shalom, and may God be with you until we meet again."

ROSS GOODRICH

THE DEPARTMENT lost another of its able employees last December 26 with the death of Ross Goodrich, an Arboretum gardener for nearly 21 years, the last six spent in the Asiatic-North American section for which he was responsible. A private, reflective man with a lively sense of humor, he approached plants and writing philosophically as well as practically, demonstrating both these approaches in the many articles he wrote for this magazine. As he cared for the plants under his charge, so he cared for the words he wrote, selecting, arranging, and fretting over them as would any professional. These qualities, the practical and the philosophical, are perhaps best revealed in the article he wrote on seedlings in the March, 1970, issue. It merits rereading on any grounds.

DESCANSO GARDENS XMAS SHOW

ALTHOUGH the event is three months old, this is our first opportunity to record a few notes on the Christmas exhibit put on by the Descanso Gardens Guild. Under the theme, "Christmas Inspirations," it represented the work of 100 amateur and professional decorators brought together by show chairman, Mrs. John H. Urabec, and Guild president, Mrs. John C. Crowley. The exhibits depicted the Christmas art of many countries, utilizing dried plant material, stained glass, ceramics, wall hangings, candles, and a much-admired gingerbread house. Attendance for the nine days the show ran was 22,000, the largest yet for this happy annual event.

ARBOR DAY

FOR MANY years the Department's observance of Arbor Day was pretty much a parochial affair consisting mainly of a tree-planting ceremony somewhere on the grounds of each garden to which students from nearby elementary schools were invited. Following the ceremony youngsters would line up with their parents to receive a seedling tree. It was clear that the principal student "involvement" was in the lineup for the plant.

Two years ago a new plan was developed that would reach elementary students throughout the county and that would involve the schools in the community in an observance of Arbor Day that was more than ceremonial. The essence of the plan was the preparation of environmental and tree-planting resource material in attractive folders to be given to schools electing to participate. The material was designed to provide teachers with background information and ideas for classroom projects. Participating schools would also receive an Arbor Day tree from the Department for a tree-planting ceremony on *their* grounds.

The plan was an immediate success. This year over 900 schools in 52 school districts representing 500,000 students are participating, and the prospect is for even wider participation next year. The trees—this year *Koelreuteria integrifoliola* (Golden Rain Tree)—were grown in five-gallon cans at the Arboretum. The yeoman job of gathering and putting together the resource material was undertaken by the Arbor Day Committee of Las Voluntarias, the hardworking volunteers of the California Arboretum Foundation.

WALKS AND LECTURES

THE DEPARTMENT'S annual series of Sunday morning walks and Sunday afternoon lectures began at the Arboretum last January 13 when Dr. Lee Enari led a record number of walkers — close to a 100 —through the Australian section. The only change in the series this year is the advance in the starting time of the walks to 10 a.m. Lectures will continue to start

at 2 p.m. Two corrections have been made in this year's printed schedule which, incidentally, is available by mail or at the information window of each garden. On April 21 at the Arboretum, Dr. Enari's discussion of poisonous and medicinal plants will be presented in the form of an afternoon lecture instead of a morning walk. John Provine's lecture on turfgrasses and ground covers, scheduled for May 19 at the Arboretum, has been cancelled in order to present the two-day "Spring Extravaganza." For those wishing information on lawns and ground covers, Armand Sarinana is scheduled to lecture on the subject June 2 at South Coast.

MEMBERSHIP GOALS

JUST TWO years ago we reported on the California Arboretum Foundation's membership goal of "1003 by '73." That goal having been reached, it followed that "2004 by '74" was the next logical figure. *That* number having been reached, the new slogan, in case you couldn't guess, is "3005 by '75." What do these figures mean and why are they being met with relatively little promotion? The meaning is simple. A bigger Foundation membership makes possible new or improved Arboretum education, research, and public service programs. The why is that people are concerned about their environment, and the Arboretum is a logical place to express their concern. Also, becoming a Foundation member is a good buy. New members immediately receive a packet of Department brochures on various gardening and environmental topics, and thereafter receive new brochures as they come out. They also receive the Foundation quarterly bulletin, this magazine, a yearly Arboretum plant introduction, and invitations to previews and special field trips. Any of these, as the saying goes, would be worth the price of admission.

Joan DeFato

LIBRARIAN APPOINTED

OUR NEW plant science librarian at the Arboretum is Ms. Joan DeFato, appointed late last fall. Ms. DeFato comes to us from New York City where she has spent the greater part of her career. She received a B.A. degree in botany from Barnard College, then an M.S. degree in library science at Columbia University.

Following two years of work in a medical library, she joined the Boyce Thompson Institute for Plant Research in Yonkers, New York, where she remained as head librarian for fourteen years. Ms. DeFato was a member of the publications committee of the Institute's quarterly journal, "Contributions from Boyce Thompson Institute." Discontinued in 1971, the journal contains research papers by a staff of some forty Ph.D.'s engaged in a wide range of projects, mostly biochemical in nature, supported in great part by government grants. The entire twenty-four volumes of the journal are available in the Arboretum reference library Ms. DeFato is now presiding over.

Roy Ito

George Lewis

ASSISTANT DIRECTOR APPOINTED

MR. ROY ITO, a veteran of 20 years of county service, was appointed assistant director of the department last December. In making the appointment, director Francis Ching chose neither a botanist nor a horticulturist, but a man with extensive administrative experience. Mr. Ito's service with the county includes five years as the personnel officer for the Department of Public Social Services, and five years as chief analyst in the Chief Administrative Office. Among county departments he has worked with as a budget analyst are District Attorney, Probation, Sheriff, Superior and Municipal Courts, Public Defender, Public Administrator, Personnel, Data Processing, County Counsel, County Clerk, and Flood Control District.

Mr. Ito has a B.A. degree in industrial psychology from the University of California at Los Angeles, and a M.S. degree in public administration from the University of Southern California.

NEW SUPERINTENDENT

WHEN GEORGE Lewis was appointed superintendent of Descanso Gardens last January 11 he became the third superintendent in the Gardens' 20-year affiliation with this department, succeeding John Threlkeld and Mark Anthony. His own affiliation has been almost as long. Starting at the Arboretum 17 years ago as a "park maintenance helper," a category that no longer exists, he advanced to Arboretum gardener in 1958, to nurseryman in 1959, and to senior gardener in 1968. In 1970 Mr. Lewis moved over to Descanso Gardens upon being appointed assistant superintendent, the position he held until his recent promotion.

Mr. Lewis' professional associations include membership for the past 10 years in the California Association of Nurserymen, member of the State Certification Board that licenses nurserymen, member of the Southern California Camellia Council and member of that organization's board of directors.

Mr. Lewis received a B.S. degree in ornamental horticulture at Hampton College in Virginia.

Plants to Look For

Frank Simerly

There are so many beautiful plants that flower in the spring that it is difficult to select one group and suggest that the visitor seek them out. However, the genus Tabebuia is such an outstanding group that when they are in flower they command attention. This group of small trees is native to the tropical Americas and has been grown in the southeastern United States for some time. The species that grow in Hawaii and Florida are too cold tender to be grown in southern California, and so it wasn't until recently that other more hardy members of this genera were introduced into the southern California area by the Los Angeles State and County Arboretum. *Tabebuia chrysotricha,* or Golden Trumpet Tree as it is popularly called, was introduced to the nurseries by the Arboretum in 1964. It is a medium size tree that grows slowly to about 20 feet. The bright golden yellow trumpets are borne in large showy clusters beginning in March and continuing into April. The tree becomes deciduous just prior to bloom which allows for a display of large masses of flowers without the distraction of foliage. Although *T. chrysotricha* will grow in a wide range of soil, it prefers a good soil with adequate drainage and will respond to frequent watering and feeding. It must be grown in full sun and will tolerate temperatures as low as 23° F. New growth on the tabebuias is typically in pairs. This dichotomous growth habit makes for a very interesting tree structure, but it also requires care in the early growth of the plant when it should be trained to a single trunk 6 to 8 feet. Very little pruning is required once the tree has been properly trained. There are no problems with diseases or insects so there is no worry about the need for use of chemicals.

You may find *T. chrysotricha* at all three of the Department's facilities. The oldest, about 20 years, and probably most beautiful specimen is at the Arboretum in Arcadia. It can be seen to the left of the walk as you approach the Demonstration Home Gardens. Other plantings can be viewed on Baldwin Avenue as you approach the Santa Anita Depot from the south, along the tram road adjacent to the South African plantings, and where there are several fine specimens. The best specimens of *T. chrysotricha* to be found at Descanso Gardens are located to the east of the Hospitality House at the south edge of the camellia forest. These are young trees that were planted about five years ago and have bloomed well every year in spite of the young age. At South Coast Botanic Garden you may see a *T. chrysotricha* near the Youth Education Center.

T. chrysotricha typically has dark green foliage with prominent veins and a tawny fuzz that covers the young twigs and leaves. These are the main characteristics that identify it and separate it from *T. umbellata* which is available now in the nursery trade in limited quantities. *T. umbellata* seems to have many attributes of *T. chrysotricha* other than

Tabebuia impetiginosa (T. ipe)

Tabebuia chrysotricha

Photos by William Aplin

COMING!
BALDWIN
BONANZA
74
Membership preview
Saturday evening April 6
6 to 8
SUNDAY APRIL 7
9:30-4:30

its pubescence and fewer flowers. *T. umbellata* can be seen at the Arboretum on top of Tallac Knoll near the *T. chrysotricha* where the two can be compared. You may also find the species *umbellata* in the plantings adjacent to Colorado Boulevard and Baldwin Avenue at the approach to the 210 Freeway.

The largest, most handsome specimen of *T. avellanedae* is on the south side of the Arboretum tram waiting area. Specimens of *T. avellanedae* can be found at South Coast Botanic Garden among their oldest plantings which are at the northeast extremity of the garden, and there is a handsome young tree at Descanso Gardens on the southeast edge of the rose gardens. There are also large specimens of this species on top of Tallac Knoll. *T. avellanedae* does not seem to bloom dependably and the reason for this has not been identified. We have noted, however, that the plant will often flower right after it has been dug up, boxed, and moved to a new location. However, it may not continue to bloom at the new location after it has become established.

There are several specimens of *T. avellanedae v. paulensis* that have flowered at the Arboretum and their flowers are lavender with a yellow throat. A specimen of *T. impetiginosa (T. ipe)* that blooms dependably can be found on the north side of the Peacock Pavilion, and a moderate-sized tree can be found at the north edge of the Demonstration Home Gardens.

The Arboretum has several other species of tabebuia mostly planted on top of Tallac Knoll east of the Aquatic Gardens. Many of them have not yet flowered. Included there is *T. chrysantha, T. donnell-smithii. T. heptaphylla. T. leucoxyla, T. ochracea* which has reportedly had yellow flowers, *T. palmeri* which has had rose-colored blooms, *T. serratifolia* which has had flowers with yellow spots, *T. rosea* which has had rose colored blooms, *T. serratifolia, T. vellosoi,* and *T. velutina.* Although most of the tabebuias flower in the spring, they do not flower simultaneously, so it will require several visits for you to look for and become acquainted with this very interesting group of plants.

Waterbush—A New Ornamental for Southern California

George P. Hanson and Carlos D. Jativa

The Los Angeles State and County Arboretum during the past few years has introduced four species and cultivars of *Grevillea* to homeowners and the nursery industry of Southern California (*G. lanigera*, *G.* 'Red Glow,' *G.* 'Pink Pearl,' and *G.* 'Pink Pygmy'). Another promising species, *Grevillea nematophylla* F.v. Muell., is now under contract with a local nursery to be introduced to the public in the near future. This species is an unusual, drought-tolerant shrub or small tree with grayish-green needle-like mature leaves, fragrant creamy-white flowers, and persistent reddish-brown fruits.

Waterbush, as *G. nematophylla* is commonly known in its native Australia, is a member of the family Proteaceae. This family includes many ornamental genera of great importance to Southern California horticulture, namely, *Banksia, Hakea, Leucodendron, Macadamia, Protea,* and *Stenocarpus.* The genus *Grevillea* was named in honor of Charles Greville, a founder and former vice-president of the Royal Horticultural Society of London.

The genus *Grevillea* includes a large and varied group of trees, shrubs, climbers, and creepers. Members of this genus could be used exclusively as ornamentals around a home without producing monotony. They vary in size, foliage, habit, floral characters, and length of the flowering season. Grevilleas have the added advantage of attracting many nectar-feeding birds to the garden.

Although the Los Angeles State and County Arboretum has growing on its grounds only a few of the many species of Grevillea, it has representatives of tall trees—*G. robusta* (silk oak tree), shrubs —*G. banksii* forsteri, and ground covers —*G.* hybrid 'Montezuma's Cloak.' Some Arboretum species have red flowers (*G. rosmarinifolia*), some have yellow-orange blossoms (*G. robusta*), and some have pale yellow inflorescences (*G. juniperina*). For range of flowering times, we have *G. hilleana* with a short blooming season (July), *G. juniperina* with a longer range of floral display (February through July), while *G. lanigera* blooms the year round.

Horticultural Uses

Grevillea nematophylla is well adapted to its new habitat in Southern California. As a potted plant it will grow best in well-aerated, porous media such as coarse sand or perlite, but in the garden it will grow in ordinary soils, rocky soils, or even in filled-in soils (South Coast Botanic Garden) that are adequately drained. This ornamental thrives in a sunny site and requires minimal care after it has become established. It prefers relatively dry conditions, and can even tolerate long periods without watering. This species is highly recommended for the desert and semi-desert areas of Southern California, but it will also grow vigorously in chaparral and foothill coastal areas. The growth rate of *G. nematophylla* in the field is about one foot per year. With optimal growth, young plants may flower during their third year. Under less favorable conditions, however, they may not flower until their sixth year. In either case, once they have begun to flower they will bloom yearly.

The species name, nematophylla, very appropriately describes the adult leaf shape which resembles round worms or nematodes (nemato=nematode, phylla=

leaves). This leaf character is no doubt partially responsible for the exceptional hardiness of waterbush (no explanation of its common name has been found). It is frost tolerant and has on occasion withstood low temperatures to 10° F. without showing any damage. In Australia it grows as a xerophytic shrub or small tree in the desert or sandy plains where it attains a height of 6 to 18 feet at maturity. When grown properly, this species is relatively free of pests and diseases.

Grevillea nematophylla can be grown as background shrubbery or screens for privacy and wind control. Its stiff, needle-like leaves would act as a deterrent to unwanted foot traffic. In Australia the waterbush displays its floriferous racemes during November, whereas in Southern California its creamy flowers appear in June and the flowering period extends through July. Flowering specimens are outstanding for their great aesthetic qualities (Figs. 1, 2, cover). The highly ornamental flowers emit a sweetish, somewhat fruity scent which attracts hummingbirds as well as bees and other insects. Apparently cross pollination is necessary for this species to set seed. In an experiment we performed last July, no fruits were produced in inflorescences which had been covered with paper or cheesecloth bags. We obtained a great number of fruits, however, from uncovered adjacent inflorescences.

Life Cycle

The life cycle of *G. nematophylla* in general is not very different from that of most flowering plants; however, the details found in this species are rather unusual. The different stages of development from young flower to mature fruit are illustrated in figures 3 through 12. Figure 3 shows a group of short-stalked flower buds (each about 3 to 4 mm long) attached to the axis of the inflorescence. In figure 4, one of these buds shows a lateral split in the perianth tube through which the stalked ovary and the style can be clearly seen. Next, the style elongates and since the ovary and the stigma are still retained within the perianth, the style arches outward through the lateral split (Fig. 5). The four perianth segments (technically known as tepals) separate along their lateral margins but retain the stigma (Fig. 6). Apparently the style continues to push its way out of the flower freeing the conical stigma of its enclosure (Fig. 7). A picture taken at the time of tepal separation shows the enclosure broken into two distinct lateral hemispheres and the stigma almost completely covered by masses of pollen grain (Fig. 8). The sessile anthers are located on the concave inner side of the tepal lobes as can be seen in figure 9. Following fertilization the tepals fall off leaving the stalked pistil by itself (Fig. 10) and exposing a persistent semi-annular gland at the base of the stalk (Fig. 11). This gland and the conical stigma are used by taxonomists to segregate this species from its closest relatives in the genus *Grevillea*. Developing young fruits with the basal gland, the ripening glabrous ovary, the style and the stigma are shown in figure 11. The fruits continue to ripen and by September they darken and begin to split open (Fig. 12). There are usually two winged seeds which escape through the split developed along one edge of the follicle (the technical name for this type of fruit). The empty reddish-brown fruits are retained by the plant throughout most of the year and provide a very attractive ornamentation when the plant is not in bloom.

Horticultural Experiments

In order to obtain the best seed germination percentage, under various treatments, several experiments have been performed in the last two years. Other

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

Fig. 8

Fig. 9

Fig. 1

Fig. 10

Fig. 1

experiments have been concurrently done to determine the best container - soil - mixture for bringing the young seedlings to the one-gallon-can stage. A brief summary of these experiments is given here with the hope that it will be of some help to the alert gardener.

The seeds of *G. nematophylla* are viable for at least one year after fruit dehiscence. Two to three-week-old seeds averaged a relatively low percentage of germination. However, when older seeds were used, the percent of germination increased and remained constant for up to one year. When both seeds from each of many follicles were planted, the germination percentages obtained were: 43%, 48%, and 43% by using 4-month, 8 - month, and 12 - month - old seeds respectively.

In the course of our seed germination experiments we observed that not all seeds were equally plump. Having in mind the possibility of finding a morphological marker which will allow us to select viable seeds, we decided to separate 200 seeds chosen at random. We further separated these seeds into a group with only plump seeds (121 seeds) and another group with non-plump seeds (79 seeds. Only one seed from the non-plump group produced a seedling. The plump-seed group, however, produced 97 healthy seedlings. We also noted that about one-half of a given seed batch was always viable. We suspected that each fruit might contain one plump, viable seed and one non-plump, non-viable seed. Last fall we decided to examine the seeds while still in the mature fruit.

Of the 129 fruits observed, 108 had one plump and one non-plump seed; three fruits contained two non-plump seeds, the remaining 18 fruits had two plump seeds per follicle.

In order to establish the optimum physical conditions for seed germination, we performed several experiments using different planting media. The water retentive UCC mixture (University of California System mixture C) was the best, and the very porous, pure propagation grade Sponge Rok (perlite) was the poorest. Other planting media used were: pure sand, and 1:1 mixtures of perlite with peat moss, UCC with peat moss, and UCC with pure sand. The best procedure we have found thus far for obtaining a large number of seedlings can be outlined as follows: the seeds are planted in a plastic pot containing moist UCC soil mixture. The seeds are evenly spaced on top of this mixture and then covered with a loose thin layer of it. This layer is then slightly compressed and the mixture is water saturated by means of mist spray or subirrigation. The pots are then covered with a piece of clear glass and placed in the greenhouse away from direct sunlight. Germination usually occurs within two weeks after planting.

Other experiments performed were designed to test the effects of various planting mixtures upon seedling growth and survival. Two variables were chosen for investigation: The degree of acidity or alkalinity (pH) and the porosity of the media. We used dolomite to raise the pH and propagation grade Sponge Rok (perlite) to increase the porosity of our standard mixture UCC II (the II indicates a specific fertilizer formula used in the UCC mixture). The experiments testing the effects of various pH levels clearly indicate that the best growth rate of *G. nematophylla* is obtained in a slightly acid planting mixture. In an early experiment, four pH levels ranging from 6.6 (unaltered UCC II) through 8.2 were used. The seedlings in the mixture with a pH of 6.6 had the fastest growth rate (27 cm in 9 months). The seedlings in the mixture with a pH of 8.2, on the other hand, had the slowest rate (22 cm in 9 months). In a second experiment, 5 - month - old seedlings had grown an average of 13 cm at a pH of 6.6, but only an average of 7 cm at a pH of 8.2.

The experiments testing the effects of the porosity of the media indicate that *G. nematophylla* requires well-aerated soils for optimum growth. We made three different planting media by using UCC II and 2 mixtures of UCC II with the porous propagation grade perlite in proportions of 2/3 UCC II: 1/3 perlite, and 1/3 UCC II: 2/3 perlite. The plants were grown in a greenhouse with low relative humidity and were watered only when the soil appeared to be very dry (approximately once a week and "as needed"). The results showed that the seedlings grown in pure UCC II had the poorest growth rate and those grown in the mixture consisting of 1/3 UCC II and 2/3 perlite had the best growth rate. Thus, the average growth of surviving 7-month-old seedlings was 11 cm in the pure UCC II and 18 cm in the 1/3 UCC II: 2/3 perlite. In 11-month-old seedlings, the average was 27 cm in UCC II and 29 cm in the second mixture. Moreover, the mortality rate was 50% higher in the seedlings grown in UCC II as compared to that of the more porous mixture.

George Hanson, senior biologist, and Carlos Jativa, biology assistant, are members of the Department research staff who have collaborated on a number of taxonomic studies of plant species having a potential for introduction to the nursery trade.

Oak Root Rot Disease and Possible Means of Control

P. C. Cheo and James E. Doty

Armillaria mellea, the oak root rot fungus, is one of the most common root rot diseases of ornamental plants and orchard trees in Southern California. The reason it is so common is partly due to the warm soil conditions and irrigation water we have throughout the year that encourage its continuous growth. Basically, *Armillaria* is a saprophyte capable of flourishing in soil for many years on dead stumps, roots, and other organic matter thereby perpetuating the state of infection to living roots. As a parasite, it is a disease of about 700 species of woody plants and some herbaceous plants reported from all parts of the world.

Most of our ornamental shrubs and trees are highly susceptible to its infection, such as roses, hollies, azaleas, privets, lilac, flowering peaches, figs, camellias, and, of course, oaks, pines, willows, citrus, and many others. Among herbaceous plants we found heavy infection on strawberry, potentilla, jade plant, geranium, and ginger. *Armillaria* is a white-rot organism having the power to break down lignin and cellulose. It attacks living and dead substrates readily if they contain sufficient quantities of starch or simple carbohydrates to give it a start. If it is well established on a decaying stump or tree it may spread far, destroying litter and fallen or standing timber as well as living hosts.

There are reports that *Armillaria* also is a mycorrhizal fungus on a few species of tropical saprophytic orchids, such as *Gastrodia elata* and *Galeola septentrionalis.* As mycorrhizal fungus, its infection benefits host plants by supplying them with needed nutrients. The growth cycles of these orchids can only be completed in nature with the help of infection by *Armillaria.* Uninfected tubers will not form flowers. The fungus first parasitizes the dormant tuber and later is kept in control by digestion as the growth of the flower shoot proceeds. *Armillaria* is capable of digesting complex organic compounds, and the orchids can then in turn derive their nutrition from the fungus. Therefore, *Armillaria* as a saprophyte and symbiont is one of the important members of the soil flora in tropical and temperate climates in maintaining the balance of nature. The parasitic activity of this fungus could be a result of human plantation and cultivation which had introduced genetic changes of both plant and fungus within local areas in a sudden way.

Armillaria infection is cosmopolitan. In the case of the oak tree, from which the fungus is first isolated and studied, few trees in these areas are completely free from its infection. Natural infection, however, will not threaten the life of native oak trees. A few roots may be

Honey Mushrooms (Armillaria mellea) *that have blossomed from tree stumps or buried infected roots in late November after the first heavy rain. They are edible, but their presence indicates trouble for your shrubs and trees.*

infected, but the tree is able to replace these with new growth. This balance can be maintained throughout the life span of the tree without serious damaging effects, unless the balance is tipped in favor of the growth of the fungus and unfavorable to the growth of roots. Surface watering of surrounding lawns and shrubs during the warm summer months softens the main roots and root-crown area, and this condition favors the progress of the fungus. The death of many oak trees in this area results mainly from the weakening of the anchor roots by *Armillaria* infection. In this condition, rain or wind storms can cause infected trees to fall. When examining them, many healthy roots can be found, and it is clear that these trees could be able to survive for many years if the anchor roots had not been weakened. Our famous Tarzan tree (*Quercus agrifolia*) in the Australian section of the Arboretum was topped down during a wind storm in the fall of 1969. That tree had good foliage display that year, and if it had not been for the weakening of one of the anchor roots, the Tarzan tree could have lived for many more years. The tall sycamore tree (*Platanus racemosa*) in front of the Queen Anne Cottage suffered the same fate a few years later. Many smaller flowering trees or shrubs, especially grown close to the lawn area where constant watering is needed during summer months, may totally collapse due to the girdling of the crown or main trunk area by *Armillaria* infection. The fungus invades and destroys the cambium area between the bark and wood, therefore, when completely girdled it chokes off the connection between branches and roots. *Armillaria* infection sometimes can be traced in the trunk area 8 to 10 inches above the ground level.

Plants that are in vigorous condition as a result of favorable climatic conditions and sound cultural practices, usually demonstrate high degrees of resistance to this disease. Otherwise, under conditions that are unfavorable to the growth of a plant or under a stress condition, they may succumb to the infection. The physiological condition of a tree may be the predisposing factor for *Armillaria* infection and development. The chemical content in roots, especially the reducing sugars, fatty acids, some amino acids and even growth hormones, are important factors in relation to root infection by *Amillaria.* Therefore, plants grown under different conditions, vary in their resistance to *Armillaria.* In locations where they are growing under conditions to

which they have adapted and which are culturally optimum, they are generally healthy and resistant to *Armillaria* infection. So far no definite report has been made concerning immunity in plants against *Armillaria* infection.

Plant resistance to *Armillaria* infection is further complicated by the occurrence of many physiological strains of the fungus. These strains not only differ in their growth patterns when cultured on artificial media, they also differ in pathogenicity with different hosts. Therefore, depending on the presence of different strains involved in an infection, the severity of the disease may vary. One species of plant may be relatively resistant to strain A, but not to strain B. The predominance of different strains in different geographic areas will affect the relative resistance of plants in that area. Some plants may be resistant when grown in one area and susceptible when grown in another area. This may be due to either growth conditions of plants, or the difference in the predominant strains of *Armillaria* in that area, or both.

Practical control of *Armillaria* root rot disease can be attained with proper cultural practice. The method of soil fumigation will not be discussed here. Soil fumigation with methyl bromide is effective in a large-scale operation, but it is expensive and is not recommended for home gardens, street plantings, or already infected trees. A valuable tree can be saved if its trunk and anchor roots can be protected from extensive infection. With good fertilization programs to keep up the vigor of the tree, these infected trees can live to their normal ages. Exposing the anchor roots in the immediate area of the trunk for a circumference of one yard to air-dried conditions during the summer months is highly recommended for oaks and other susceptible trees. Deep watering is recommended when watering is needed. Surface watering, especially the wetting of the trunk and anchor roots area should be avoided.

An effort has been made at the Arboretum to find chemicals that are specifically effective in inhibiting the growth of *Armillaria* and which can then be applied to exposed areas for further protection. Many systemic chemicals that can be transported by plants have been tried in our laboratory. Of 20 chemicals tested, three were highly effective, showing strong inhibitory effects to the growth of *Armillaria* at or below the 50 ppm level. These three effective chemicals are: (1) Actidione (cycloheximide), an established fungicide, (2) Diuron (3-(3, 4- dichlorophenyl) - 1 - 1 - dimethylurea). a herbicide, and (3) 2,4-dichlorophenoxyacetonitrile, a new chemical closely related to 2,4-D.

At present, actidione is being studied at the Arboretum for practical applications in the field. The active ingredient in actidione is cycloheximide, a potent inhibitor in protein synthesis. Cycloheximide completely inhibits the growth of *Armillaria* at concentrations of 25 ppm in culture medium tests. Strong inhibition still exists at a concentration of 10 pp. A solution at a strength of 200 to 300 ppm of cycloheximide can be applied to oak trees without harmful effects to the tree.

A new pressure injector has been developed by the Elm Research Institute. Waldwick, New Jersey, for the control of Dutch Elm disease. This Model 102 pressure injector provides a fast, easy and effective means of injecting the fungicide into trees. It is hoped that by injecting cycloheximide into the crown and anchor root areas, further fungus activity in that area can be stopped and the tree can be saved from further damage by this disease. Experiments with cycloheximide applications will be carried out at Descanso Gardens. The results can then be analyzed for the effectiveness of the application.

VICTORIA REGIA, Royal Water-Lily

An Arboretum is for people . . .

The aquatic garden at the Los Angeles State and County Arboretum is an ecological wonderland, equally utilitarian, educational, and beautiful. It contains edible plants like the water-chestnut, fish that eat mosquito larvae — the fish are collected and given to the public during the summer for use in home ponds — and plants of rare beauty like the royal water-lily, **Victoria regia.**

This native of the Amazon and its tributaries consists of a fragrant white flower, green platter-like leaves three to six feet in diameter, and long cable-like leaf stalks. During its flowering period in warm weather, the flower opens in the evening and remains open until the middle of the following morning. The leaves have been known to sustain weights of up to 200 pounds.

SCE

Southern California Edison Company

BOOKSHELF

New acquisitions to LASCA Plant Science Library

GENERAL

THE ABC OF INDOOR PLANTS, Jocelyn Baines and Katherine Key. Knopf, N.Y. 1973. 192 p. Color photographs.

COLOR FOR THE LANDSCAPE, Mildred Mathias, ed. Los Angeles Beautiful, and others. 1973

COMMERCIAL FOREIGN WOODS ON THE AMERICAN MARKET, David Kribs. 2nd ed., rev. Dover, N.Y. 1968

THE COMPLETE BOOK OF HOUSEPLANTS, Charles M. Fitch. Hawthorne Books, N.Y. 1972. 308 p. Black and white and color photographs.

DRIED FLOWERS, The Art of Preserving and Arranging, Nina de Yarburgh-Bateson. Scribner's, N.Y. 1972. 169 p. Black and white and color photographs.

DRUGS AND FOODS FROM LITTLE-KNOWN PLANTS, Notes in Harvard University Herbaria. Siri von Reis Altschul. Harvard University Press, Cambridge. 1973. 366 p.

DYES FROM PLANTS, Seonaid M. Robertson. Van Nostrand Reinhold, N.Y. 1973. 144 p. Black and white and color illustrations.

EDIBLE NATIVE PLANTS OF THE ROCKY MOUNTAINS, H. D. Harrington. University of New Mexico Press. 1967.

FERNS OF SAN DIEGO COUNTY, Helen Witham. San Diego Society of Natural History. 1972. 72 p. Black and white photographs.

FLOWERS OF SOUTHWEST EUROPE: A Field Guide, Oleg Polunin and B. E. Smythies. Oxford University Press, London. 1973.

THE FOREST AND THE SEA, A Look at the Economy of Nature and the Ecology of Man. Marston Bates. Vintage Books, N.Y. 1960

GREENHOUSE GARDENING, 2d ed., Henry and Rebecca Northen. Ronald Press, N.Y. 1973. 388 p. Black and white photographs.

HAWAII: A Natural History, Sherwin Carlquist. Natural History Press, Garden City, N.Y. 1970.

THE MEDICAL GARDEN, Geoffrey Marks and William Beatty. Scribner's, N.Y. 1971.

MEDICINAL AND FOOD PLANTS OF THE NORTH AMERICAN INDIANS: A Bibliography, Lothian Lynas. New York Botanical Garden. 1972.

THE OXFORD BOOK OF FLOWERLESS PLANTS, Frank H. Brightman. Oxford University Press, London. 1966.

PLANTS IN THE DEVELOPMENT OF MODERN MEDICINE, Tony Swain, ed. Harvard University Press, Cambridge. 1972.

PLANT NAMES: COMMON AND UNCOMMON. Sonia Wedge, comp. New York Botanical Garden. 1973.

A SURVEY OF THE SLIPPER ORCHIDS, Hugh and Catherine Waters. Carolina Press, Shelby, N.C. 1973. 145 p. Black and white and color illustrations.

THE TERRARIUM BOOK, Charles Evans and Roberta Lee Pliner. Random House, N.Y. 1973.

TREES OF SOUTH AFRICA, Eve Palmer and North Pitman. Vol. 2. Cape Town, Balkema. 1972.

WILD EDIBLE PLANTS OF THE WESTERN UNITED STATES, Donald Kirk. Naturegraph, Healdsburg, Ca. 1970. Black and white illustrations.

THE WORLD OF LEARNING, 1972-3. 23rd ed. Europa Publications, London. 2 vols. 1972.

TECHNICAL

AIR POLLUTION INJURY TO PLANT LIFE, Donald H. Scott. National Landscape Assn., Washington, D.C. 1973.

ECTOMYCORRHIZAE: Their ecology and physiology, G. C. Marks and T. T. Kozlowski, eds. Academic Press, N.Y. 1973.

THE FLORA OF GUAM, A manual for the identification of the vascular plants of the island, Benjamin C. Stone. University of Guam. 1970 (Micronesia, v. 6).

PREPARING HERBARIUM SPECIMENS OF VASCULAR PLANTS, Earle C. Smith, Jr. Agricultural Research Service, U.S. Dept. of Agriculture. Informaiton Bulletin No. 348. 1971

MAGAZINES

PLANTS ALIVE. Published monthly by Plants, Inc., Seattle, Washington.

ARBORETUM WEATHER

Long. 34d 08' 48" N.
Lat. 118d 02' 59" N.
Elev. 571.28 ft.

Weather season:
Oct. 1 to Sept. 30

	Dec.	Jan.	Feb.
Average daily maximum temperature	70.5	63.4	72.0
Average daily minimum temperature	43.2	43.4	43.3
Highest temperature	85	80	83
Lowest temperature	34	33	37
Number of clear days	20	15	24
Number of partly cloudy days	7	6	3
Number of cloudy days	4	10	3
Rain during this month	.91	9.21	.09
Total rain since Oct. 1st	2.88	12.09	12.18

Calendar

April, May, June

ARBORETUM, Arcadia

April 7 — 9:30 to 4:30 p.m.
Baldwin Bonanza
Presented by the California Arboretum Foundation

April 20, 21 — 8 to 5 p.m.
Iris Show *
Presented by the Southern California Iris Society

April 21 — 2 p.m.
Sunday Afternoon Lecture *
"Poisonous and Medicinal Plants"
Dr. Leonid Enari, senior biologist

April 27, 28 — 8 to 5 p.m.
Amaryllis Show *
Presented by the Southern California Hemerocallis and Amaryllis Society

May 1 — 11 to 3 p.m.
California Arboretum Foundation Annual Membership Meeting

May 4, 5 — 9 to 5 p.m.
Rose Show *
Presented by the Pacific Rose Society

May 5 — 10 a.m. to Noon
Sunday Morning Garden Walk *
"Historic Area/Herb Garden"
Dr. Leonid Enari, senior biologist

May 12 — 1 to 5 p.m.
Epiphyllum Show *
Presented by the Epiphyllum Society of America

May 18, 19 — 8 to 5 p.m.
"Spring Extravaganza" *

May 25, 26, 27 — 8 to 5 p.m.
Bonsai Show*
Presented by the Akebono Bonsai Society

June 2 — 10 a.m.
Sunday Morning Garden Walk *
"Displays and Greenhouse"
John Provine, horticulturist

June 22, 23 — 8 to 5:30 p.m.
Gladiolus Show *
Presented by the Southern California Gladiolus Society

June 23 — 2 p.m.
Sunday Afternoon Lecture *
"Foliage Plants"
Don Fitch, nurseryman

*Sponsored by the California Arboretum Foundation

DESCANSO GARDENS, La Canada

April 7 — 10 a.m.
Sunday Morning Walk **
"Native Plants and Flowering Fruit Trees"
George Lewis, superintendent

April 28 — 2 p.m.
Sunday Afternoon Lecture**
"Composting"
George Lewis, superintendent

May 26 — 3 p.m.
Concert on the Lawn **
Glendale Community Symphony
Wesley Cease, conductor

June 2 — 11 to 4:30 p.m.
Annual Art Festival on the Lawn **

June 9 — 10 a.m.
Sunday Morning Walk **
"Roses and Annual Flower Beds"
George Lewis, superintendent

**Sponsored by the Descanso Gardens Guild

SOUTH COAST BOTANIC GARDEN, Palos Verdes Peninsula

April 20, 21 — 8 to 5 p.m.
Garden Show ***
Presented by the Silver Spur Garden Club

April 27, 28 — 8 to 5 p.m.
Bromeliad Show ***
Presented by South Bay Bromeliad Associates

May 5 — 2 p.m.
Sunday Afternoon Lecture***
"Composting"
Edward Hartnagel, assistant superintendent

May 19 — 6 p.m.
Annual Meeting South Coast Botanic Garden Foundation

May 25, 26, 27 — 8 to 5 p.m.
Cactus and Succulent Show ***
Presented by South Bay Cactus and Succulent Society

June 2 — 2 p.m.
Sunday Afternoon Lecture ***
"Lawns and Ground Covers"
Armand Sarinana, superintendent

June 16 — 10 a.m.
Sunday Morning Garden Walk ***
"Aquatic Section"
Edward Hartnagel, assistant superintendent

June 21, 22, 23 — Fri., 1 to 5 p.m.
Sat./Sun., 10 to 5 p.m.
Fiesta de Flores
Presented by the South Coast Botanic Garden Foundation

***Sponsored by South Coast Botanic Garden Foundation

BIRDWALKS

ARBORETUM
1st Sunday of each month at 8 a.m.
Sponsored by Pasadena Audubon Society

DESCANSO
2nd and 4th Sunday of each month at 8 a.m.
Sponsored by San Fernando Audubon Society

SOUTH COAST BOTANIC GARDEN
3rd Wednesday of each month at 8 a.m.
Sponsored by South Coast Botanic Garden Foundation

June
1974
Vol. XXIV
No. 2

Itasca Leaves

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Lasca Leaves

Published quarterly by the California Arboretum Foundation, Inc., for the Department of Arboreta and Botanic Gardens of Los Angeles County.

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Editor
Donald S. Dimond

Cover photo by Francis Ching

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department notes

WHAT'S RIGHT

Retiring Supervisor Ernest E. Debs has issued a series of news releases under the heading, "What's Right With County Government." The following is what he had to say about this department:

"Long before environmental protection became a popular cause, the County Department of Arboreta and Botanic Gardens was providing the people with a better understanding of our relationship with nature.

"This past year, 982 schools in Los Angeles representing up to 500,000 grade school children took part in the Arboretum's Arbor Day Program offering a meaningful experience with nature. In other educational programs, over 70 classes dealing with various phases of plants, conservation, and environment are offered each year to youths and adults and a new program of taking the Arboretum to the schools is being planned for implementation in October.

"Arboretum Public Services Programs include informational services in person, by telephone, or by correspondence which are available all year around to the general public as well as to governmental agencies involved in environmental impact reports and related matters.

"Other services include Sunday morning walks and Sunday afternoon lectures that mix pleasure with learning; special tours of the Arboretum for senior citizens and minority groups; and plant identification and horticulture advice. Since 1970, many brochures and booklets on various horticultural subjects have been published and made available to the public on the subjects of poisonous plants, vegetable gardening, safe use of pesticides, beneficial insects, and fire and erosion control plants. Public lectures, garden walks, displays of groundcover, turfgrasses, home patios, and plant materials of various sorts are all designed for public awareness.

"Ongoing research projects include exploring the effect of air pollution on plants—and how trees can be used to minimize the effects of smog. Another research project concerns the possible use of sewage water to irrigate, instead of dumping effluents into the ocean. Still another is the development and testing of fire retardant plants that help control erosion and brush fires in our hillside residential areas.

"Plant pathology is a matter of immediate concern to home gardeners whose vegetables may be dying from viruses or whose entire garden may be suffering from oak root rot fungus so widely prevalent in Southern California. Arboretum researchers have come up with chemical formulas that either ease or correct such problems.

"Besides public services, educational, and research programs, Los Angeles County's Arboreta and Botanic Gardens offer a haven of tranquility, composed of landscaped gardens, ornamental pools, natural lagoons, waterfalls, and a multitude of floral gardens. Each year, a growing percentage of the County's seven million residents discover these wonderful public facilities.

"Twenty-six years ago the Board of Supervisors realized that Los Angeles was fast becoming a complex of steel, concrete, and asphalt without a corresponding awareness of the need for plant life and its lifegiving and aesthetic values. Today, the Arboretum's vital contribution to our community is rightfully recognized and appreciated."

NEW EDUCATION CHIEF

MR. TAKAO NIIYA has been appointed chief of the department's education division succeeding Gertrude Woods who retired from the position and from county service earlier this year.

Mr. Niiya's appointment marked the high point in a series of through-the-ranks promotions that have brought him in eleven years of service in the department from Information Aide, to Education Specialist, to his present post. In this period he has mixed down-to-earth horticultural field practice with organizational and development work in the youth education program at South Coast Botanic Garden, a program he later expanded and supervised at all three department gardens. In his new position, Mr. Niiya will be responsible for coordinating all department education programs. Designed for home and professional gardeners, for students, and for those interested in ecological studies, they include day and evening courses for adults, daytime mini-courses in different aspects of the botanical sciences and popular home gardening, and after-school and Saturday classes for young people in gardening, nature crafts, and environmental studies. Also under his direction are the yearly Arbor Day programs, the Sunday afternoon lectures and Sunday morning garden walks, the plant

CHARLES HOWARD LEE

science library, and the historical section. Mr. Niiya is a graduate of the University of Hawaii where he received a B.S. degree in agriculture in 1958.

CONSULTANT APPOINTED

Though it has been high on the Department's priority list, filling the position of horticultural consultant, made vacant last January by the death of George Spalding, has not been easy, requiring, as it does, the right mix in the applicant of scientific and practical training, knowledge of local conditions, and sympathy with the problems of home gardeners. As it turned out, the candidate chosen was already working here. He is Charles Howard Lee, a friendly, easy-going young man who had come to the Arboretum just a few months ago as an assistant nurseryman. He had been working the previous eight years in the largest container nursery in the world, Monrovia Nursery, where he began as a field hand and ended as production control manager. "Howdy," as he is known to his friends, came to Monrovia following his graduation from Penn State University with a B.S. degree in ornamental horticulture. We are pleased to have him as our new botanical information consultant and we think the public will be too.

Photo by William Aplin

FIELD DAYS AT THE ARBORETUM

Under the banner, "Spring Extravaganza," practically the entire department staff labored mightily to prepare and present on May 18 and 19 two of the most comprehensive horticultural field days ever attempted. With the aid of California Arboretum Foundation volunteers and fifteen garden societies whose members manned their own booths and exhibits, no horticultural question, no "how-to" garden demonstration, and no environmental question involving plants failed to receive attention. The public loved it.

They set a new attendance record—27,481 people in two days—arriving early and staying late in an effort to take in all there was to see and hear. Each day from ten to four talks were given on the hour by members of the orchid and herb societies in one half of the Arboretum lecture hall while in the other half those same and other societies were exhibiting their specialties. From ten to three each day in the Demonstration Home Gardens staff members and members of the Santa Anita Bonsai Society gave hourly demonstrations on such subjects as bonsai, container gardening, grafting, composting, corsage making, and "saikei," a lesser-known form of bonsai in which a miniature landscape scene with a number of different plants is the subject. Then there were three-a-day demonstrations on vegetable gardening in the Garden For All Seasons for which bleachers were brought in to accommodate the audience, sales of orchid corsages, carnivorous plants, and Arboretum plant introductions, and open house in the research labs, nursery, library, orchid and begonia houses. To top it all off, free packets of vegetable seeds were distributed to all.

Photo by William Aplin

TROPICAL GREENHOUSE

A contract has been awarded for the construction of a 100'x38' tropical greenhouse just west of the Arboretum orchid greenhouses that will add a new educational dimension to the Arboretum's botanical resources. The greenhouse will make possible the growing of some of the larger tropical plants as well as those of interest and curiosity to the public. There are, for example, tropical plants of economic value which most people know only in the form they find them in their grocery store. Among such are *Piper nigrum* (pepper), *Elettaria cardamomum* (cardamon), *Zingiber* (ginger), *Vanilla fragrans* (vanilla, and *Cola acuminata* (cola drinks). The ceiling height of the greenhouse will be about fifteen feet enabling the accommodation of small trees such as plumerias and a variety of tropical palms. To add to the tropical effect, a stream and waterfall have been included in the construction plans.

FIESTA DE FLORES

This year's Fiesta de Flores at South Coast Botanic Garden June 21, 22, and 23, promises to be the most colorful and diversified in the history of the event. Although details of the flower show portion of the fiesta were not available at the time this was written, the usual complement of garden demonstrations, talks, exhibits, and competitions can be expected, beginning at 1 p.m. opening day. Boutiques, set up in three different locations on the grounds, will offer plants in all sizes, from herbs and container plants to small trees. A formal opening will be held at 5 p.m. at which Supervisor James Hayes is scheduled to be the principal speaker. A social hour open to foundation members and their guests will follow the opening program. On Saturday afternoon a group of Japanese classical dancers will perform a Japanese fairy tale with narration, and on Sunday afternoon the Palos Verdes Symphonic Band will give a concert. An ensemble of young flutists and strolling guitarists will add to the spirit of the fiesta during the three-day run of the show.

GUILD ACTIVITIES

The Descanso Gardens Guild has announced that the Glendale Community Symphony, heard at the gardens just a few weeks ago, will be back for three concerts on the lawn during the weekend of July 27 and 28.

The model kitchen in the Hospitality House continues to be the focal point of a variety of talks and demonstrations. Lectures on freezing techniques and on summer casseroles will be given there at 10 a.m. and 1 p.m. on July 17.

It may seem early to talk about Christmas but not when the reference is to the Descanso annual Christmas show. Craft classes, meeting every Tuesday in the Hospitality House, are open now to people interested in making items for the event.

LOVE'S END

The end of the mating season for peafowl has come and with it an end to the spectacular spreading of male train feathers and a lessening of the shrill cries of both peacock and peahen. Though residents for miles around have largely become accustomed to the remarkably intense sounds of these wild birds, long the symbol of the city of Arcadia, the quiet following their completion of the mating games will be welcome. Now we have only to look for hatching eggs—often in the strangest places—and listen to the cheeps of peachicks and their clucking mother.

Sundews

James Doty

Drosera's leaves with sunny dew
Serve to mire the careless few
Critters who take its shining drops
For Arthropodian droughts of Schnopps.

There are about 90 species of *Drosera* scattered all over the world. They range in size from the dime-sized *Drosera pygmaea* to *Drosera gigantea,* which can grow over three feet tall. Commonly called sundews, they are generally the best known carnivorous plants.

Sundews were first known as medicinal herbs. In medieval Europe, *Drosera rotundifolia* was known as Ros solis. During the reign of Queen Elizabeth I of England, Henry Lyte esp. produced an English translation and embellishment of Dodoen's *A Niewe Herbal,* in which he wrote:

Of. Mosse. Chap lxxi.

The Kydnes

There be many sortes of Mosse, whereof some growe in the feeldes, some upon trees trees (sic), and some in shadowie and moyst woods, and some in the rocks of the sea. . . .

The fourth kinde called *Rosa Solis,* hath reddishe leaves, somewhat rounde, hollowe, rough, with long stemmes, almost fashioned lyke little spoones, amongst the whiche commeth up a short stalke, crooked at the toppe, and carrying little white flowers. This herbe is of a very strange nature and marvelous: for although that the Sonne do shine hoate, and a long time thereon, yet you shall fine it alwayes moyst and bedewed, and the small heares thereof alwayes full of little droppes of water: and the hoater the Sonne shineth upon this herbe, so muche the moystier it is, and the more bedewed, and for that cawse it was called *Ros Solis* in Latine, which is to say in English, The dewe of the Sonne, or Sonnedewe. . . .

The *Ros Solis* is hoate and drie almost in the fourth degree. . . .

Ros Solis brused with Salt, and bound uppon the fleshe or bareshinne maketh blisters and holes, even as Cantherides, as you may prove by experience.

The common sort of people do esteeme this herb (but especially the yellow water) distilled of the same, to be a singuler and special remedie for such as begin to drie away, or are fallen into consumptions, and for them that are troubled with the Disease called Asthma, whiche is a straightnesse in drawing of breath, or with any ulceration of the lunges: thinking that it is very consolidative, and that it hath a special vertue to strengthen and nourish the body: but that whiche we have recited before concerning the vertue of this herbe, declareth sufficiently, that their opinion is false. (Dodoens, D. Rembert. A Niewe Herbal. translated by Henry Lyte Esq., Gerard Dewes, Pawles Churchyarde at the Signe of the Swanne. 413-415. 1578).

Later authorities have made similar assertions. Whether these authors based

their statements on independent observations or were merely repeating the statements of their predecessors is not certain. C. S. Rafinesque reported in *Medical Flora* (2:217. 1828.) that the juice was used to destroy warts and corns and that a mixture of the juice with milk is useful for the treatment of sunburn and removal of freckles.

Rafinesque further reported that "Ros solis" was used in a syrup in South Africa to treat asthma. His meaning here is unclear. He does not indicate whether the Europeans in South America used this drug, thus following traditional practice, or whether the South American natives used this drug as their own invention. This latter case is dubious as *Drosera rotundifolia* does not occur in South America. However, Rafinesque may be including another species under the name, Ros solis.

Whatever the explanation is for Rafinesque's statements, it is apparent that different peoples throughout the world derived their own uses for *Drosera*. In India *D. burmanni* (Hindu name: Mukha-jali) was used as a rubefacient, whereas *D. peltata* (Hindu name: Mukhajali, Punjab name: Chitra) was used as a blistering agent and combined in a preparation of gold "ghasma" used as an antisyphilitic, alteritive and tonic. *D. indica* was used for similar purposes (Chopra, Nayar and Chopra, Glossary of Indian Medicinal Plants. 1956). In Mexico, a *Drosera* resembling *D. rotundifolia* (possibly *D. rotundifolia* itself) was used in a decoction (Chinantec name: O-ku-tu-ru) to treat toothaches and intestinal troubles (Altschul, Siri von Reis, Drugs and Foods from little-known plants. Harvard Univ. Press, Cambridge, Mass. 1873). However, the Kwakiutl Indians of British Columbia reached the zenith of the herbalist's art by combining *D. rotundifolia* with another plant (either *Habenaria saccata* or *Hypopites monotropa*) and the toes of a salamander (*Ambystoma macrodactylum?*) to make a potion called: welxwayas nanulhawayoxa ts' edak—medicine to make women love-crazy (Turner, Nancy Chapman and Marcus A. M. Bell, Ethnobotany of the Southern Kwakiutl Indians of British Columbia. Economic Botany 27(3):257-310. 1973).

The insect-catching virtues of sundews were not noticed until the end of the eighteenth century. Probably the first written account of the entrapment of insects by *Drosera* was published by a German botanist, Abrecht Roth, in July of 1779:

> I remarked that many leaves were folded together from the point towards the base, and that all the hairs were bent like a bow, but there was no apparent change on the leaf-stalk. Upon opening the leaves, I found in each a dead insect. Hence I imagined that this plant, which has some resemblance to the *Dionaea muscipula* [Venus' flytrap], might also have a similar moving power.
>
> With a pair of plyers I placed an ant upon the middle of a leaf of the *D. rotundifolia,* but so as not to disturb the plant. The ant endeavoured to escape, but was held fast by the clammy juice at the points of the hairs, which was drawn out by its feet into fine threads. In some minutes the short hairs on the disk on the leaf began to bend, then the long hairs, and laid themselves upon the insect. After a while the leaf began to bend, and in some hours the end of the leaf was so bent inwards as to touch the base. The ant died in 15 minutes, which was before all the hairs had bent themselves. . . . (Roth, Albrecht Wilhelm, Von der Reizbarkeit der Blätter des sogenannnfen Sonnenthaues. Beitrage zur Botanik. 1:64. 1782. *fide* Withering. Wilson. Arrangement of British Plants . . . 2:323-326. 1796).

Other accounts soon followed (fide: Darwin, Erasmus. *The Botanic Garden* 2

Octopus-like Drosera filiformis (right foreground) is shown here with one of its tentacular leaves extended across the terrarium toward the photographer. The leaves of this North American species can reach two feet long and look quite different from those of Drosera rotundifolia.

(1):229. 1791; and Withering, Wilson, *Op. Cit.*) but the full significance of the phenomenon was not immediately realized. Erasmus Darwin (*Op. Cit.*) suggested that the, "Drosera mucilage prevents small insects from infesting the leaves." Wilson Withering (*Op. Cit.*) too, remarked, "It is natural to enquire whether this destruction of insects be not necessary to the welfare of the plant?"

The time and place of the actual discovery and substantiation of the fact that these plants gain nourishment from their victims has remained obscure to me. It is apparent, though, that this discovery was not widely accepted (or at least discussed) until after ca. 1850. It is interesting that Charles Darwin, grandson of Erasmus Darwin who helped publicize first descriptions of trapping mechanisms of sundews, wrote the first definitive work on carnivorous plants (*Insectivorous Plants,* D. Appleton and Co., London. 1875). Charles Darwin's book introduced *Drosera* to the public in a new light, not as Ros Solis—a medicinal herb, but as a botanical curiosity.

The details of how *Drosera* traps its prey and how this compares with other carnivorous plants are well related by Katsuhiko Kondo in a previous issue of Lasca Leaves (Kondo, Katsuhiko, Carnivorous Plants. Lasca Leaves 23(2):77-84. 1973). I have tried to show here the early history of *Drosera,* from a remedial herb holding mysterious and powerful sway over a woman's love and other natural forces, to a terrarium oddity with the less mysterious but nonetheless wonderful ability to catch and consume animals.

HOW TO GROW SUNDEWS

A terrarium makes an ideal setting for *Drosera.* Use Canadian sphagnum or a potting mix composed of peat moss and sponge rock (1:1). Keep the soil moist with clean rain water or distilled water. Too much water will encourage mold and damping off. Fungus can be controlled using a 100 ppm suspension of Benlate 50% WP (i.e., a solution containing 50 ppm of the active ingredient) applied at is best to let the plants catch their own is best to let the plants catchc their own bugs. If you can't resist temptation, you can feed your plants small insects or insect-size pieces of meat, but be careful not to overfeed; leave two or three leaves empty.

The terrarium can be sealed or remain open depending upon your particular conditions and tastes. The plants should receive ample light. In closed terraria, exposure to bright light will cause temperatures higher than optimum (65-80° F). However, a closed terrarium when properly prepared, can remain undisturbed for six months to a year. An open terrarium, though requiring more attention can ultmiately result in better looking plants. Direct sunlight (unfiltered by any glass) will stimulate red pigmentation in the leaves. Placing the open terrarium outdoors for a few hours on mild days will encourage the bright red leaf-blades displayed by some *Drosera* species (e.g. *Drosera rotundifolia, D. binata*) but be very careful to avoid excessive heating of the air or soil in the terrarium.

James Doty is a biology assistant in the department's research division. Primarily concerned with plant pathology, Mr. Doty from time to time writes about less common flora that engage his attention.

PLANT PORTRAITS

DAWN REDWOOD AT ATLASCA

Leonid Enari

In 1944, Mr. Tsang Wong, a staff member of the Central Bureau of Forest Research of the Chinese National Government, came upon an enormous tree near the village of Mo-tao-chi, in the province of Szechuan in Central China. Since he never had seen one like it, Mr. Wong took specimens of its needles and cones with him to Nanking. Here, Dr. Wan-Chun Cheng, Professor of Forestry at the National Central University, was equally puzzled but believed the tree to be a species closely related to California redwoods. After securing specimens of flowers and mature cones from the same tree in 1946, he referred the material to Dr. Hsen-Hsu Hu, Director of the Fan Memorial Institute, who finally identified it as a species of the genus *Metasequoia.* After further study it was proved to be a new species and described as *M. glyptostroboides* by H. H. Hu and W. C. Cheng.

What made this discovery sensational was that the *Metasequoia* was a genus believed to have been extinct at least twenty million years ago.

Since then, various botanists have visited the Mo-tao-chi area and published accounts of the occurrence of *Metasequoia glyptostroboides,* or dawn redwood as it popularly became known, in its natural habitat. According to these records, the dawn redwood grows mainly in the Li-

chuan district in northwestern Hupeh province, ranging here and there across the border into Szechuan province. The trees are most abundant within the Shui-sha Valley, at an elevation of 2100 to 4000 feet, and gradually become more scattered as they spread from the center. In this area it thrives best along the rocky banks of small streams and seepage grounds at the foot of slopes, forming dense thickets with other trees and shrubs including chestnuts, sweet gums, dogwoods, maples, beeches, oaks, sassafrases, spireas, hydrangeas, viburnums, cotoneasters, buckthorns, honeysuckles, ivies, roses and actinidias. The occurrence of isolated big trees at considerable distance from the valley indicates that the dawn redwood was once much more widespread. Those trees reach up to 150 feet, are 300 years or more in age, and antedate the settling of the area some two hundred years ago.

The dawn redwood has survived in the Shui-sha Valley because the valley is a closed basin surrounded by deep mountain ranges 900 to 1500 feet high on nearly all sides, is isolated, and is more sparsely populated than any other part of the region.

Since 1948, wide scale dissemination of seeds has established dawn redwood as one of the most universally planted trees in botanical gardens and arboretums all over the world. It has proven to be hardy in southern Alaska, southern Canada, Norway, Sweden, and various parts of Russia.

In the Los Angeles State and County Arboretum, the tree is represented by four accessions located in quadrats K11, M5, N8, N12 and P15. The tree in M5 (east side of the lagoon, photo opposite page) was given to the Arboretum in 1948 as a small plant in an 8-inch pot by Dr. Frits Went, then professor of Plant Physiology at the California Institute of Technology. It was transferred into a five-gallon container in 1950, and on November 13, 1951, was planted in the present location by Arcadia High School students as a living memorial to the school's dead in the Korean War. The tree was measured in August, 1970, and found to be 61½ feet high.

The shoots of dawn redwood are oppositely arranged and of two kinds, long shoots of indeterminate, and short shoots of determinate, growth. The short shoots are deciduous. The leaves are oppositely arranged, flat and linear. The male strobuli (conelets) are stalked and decussately arranged in clusters. The female strobuli (conelets) are stalked and produced singly in leaf-axils or on special branches or shoots. The cones are pendulous, matture in the first year, and are dark brown in color. The middle scales of the cone are fertile and bear 5 to 8 seeds. The seeds are winged. The embryo usually has two cotyledons.

According to current taxonomic opinion, dawn redwood belongs to the family *Taxodiaceae* and is most closely related to the genera *Taxodium* and *Sequoia.* In N8, east of the Coach Barn, a dawn redwood is planted close to a Montezuma cypress (*Taxodium mucronatum*) and coast redwood (*Sequoia sempervirens*), offering an opportunity to compare the identifying characteristics of these trees. The dawn redwood differs from the Montezuma cypress by its oppositely arranged leaves and from the coast redwood by its oppositely arranged leaves, deciduous habit in winter, and absence of sucker growth.

Dr. Enari is a senior biologist (toxonomy and herbarium) in the department's research division. He is the author of a number of textbooks and the author of the department's popular brochure on poisonous plants of Southern California.

A New Youth Education Program

Ronald B. Call

"They're growing, they're growing," exclaimed an excited class of fifth-grade students recently as the education assistant entered the classroom of a Los Angeles public school. "The beans we planted are growing and the ones in the sand are the biggest." Scenes such as this are rapidly becoming a common occurrence throughout the South Bay and San Gabriel Valley areas served by the Youth Education Section of the Department. "Taking the Arboretum to the schools" is part of a new program recently introduced into the public school system to teach youngsters the importance of plants and nature and the purposes and functions of an arboretum and botanic garden. In the past, it had been the policy to have a limited number of children attend workshop-type classes in gardening and horticulture after school or on Saturday. Generally speaking, the majority of the children taking advantage of this highly successful program lived within a few miles of the garden. This new program was created to fill the needs of the school districts in their natural science curriculum. With the addition of this program, many times the number of children can be reached over a much larger geographical area. The basic concept is to take a "workshop" to the schools and present a program that stimulates the youngsters while informing them about the fundamentals of horticulture. It is being noted that students who haven't had the opportunity to become interested in plants *are* becoming interested after being involved in this program.

The program is set up so that each class of 4th, 5th, or 6th graders will receive three hours of concentrated information in two sessions spaced two weeks apart. The presentation is given in a combination of demonstrations, thought-provoking questions, and lectures. Materials are left behind in the classroom after each session so the children can carry out suggested experiments and projects at their own pace at a later date.

Upon arrival at the classroom, an introduction to each of the Department's gardens is given, using photos and general information about the history of the area. Students are urged to visit and use the gardens whenever possible and they and their parents are advised of the services provided by the Department's facilities.

A discussion is initiated and a list is made to illustrate all the things that plants provide. The children come to the conclusion very quickly that without plant life on earth, life for us would soon cease to exist. Basic plant needs and care are discussed with special attention being given to soil. Samples of different kinds of soil are left behind in pots and the children are instructed to plant bean seeds in each sample. As the seeds grow, the students observe the growth rate and general appearance of the seedlings. They are asked to graph the growth rates and explain why the plants do better in one soil than in others. It might be noted that for some youngsters this is really the first experience they have ever had in planting seeds and caring for the resulting plants. Oftentimes, this can be the greatest reward of the whole program. The students are also given the assignment to study the soils around the school area and around their own homes to try and determine what kinds of soil they have.

Discussions and demonstrations of several methods of plant propagation are illustrated. Emphasis on seeds, cuttings,

bulbs, and bulb-like structures are stressed as well as several other minor methods. Samples of each method are left in the student's care to observe over the next few weeks.

A general question-and-answer period usually terminates the presentation. Explicit instructions are given on the care of all materials left behind as well as assignments to be prepared for the next visit.

On the follow-up visit, two weeks later, a short review is made of what was covered in the first visit. Results of the experiments and projects are discussed. As can be imagined, results of the experiments vary greatly. Some projects fail while others work perfectly. Negligence in following the outlined steps usually ends in failure. Even this, however, can become a learning experience for the children. For the most part, though, the experiments and projects come out quite favorably.

The emphasis of the second visit is on making terrariums. The school is asked to have ready a clean, five-gallon aquarium with a glass cover for this project. Different aspects of terrariums are covered along with related subjects, for exemple, environment in the terrarium, geographical areas where similar environments might be found, and so on. One of the most popular portions of the entire presentation is the actual making of the terrarium. After it has been completed, most children are very enthusiastic about making their own terrarium to take home. A demonstration is then made to show how they can indeed make small terrariums as a class project, using cuttings taken from the big terrarium. The water cycle in the terrarium, as opposed to the water cycle outdoors is discussed. A brief presentation of botanical plant names completes the course. The youngsters are urged to continue their studies of plants and again invited to participate in activities at the garden nearest to them: the Arboretum in Arcadia, Descanso Gardens in La Canada, or South Coast Botanic Garden on Palos Verdes Peninsula.

The educational aspects of this program are boundless. Many other subjects can be tied into this program and it can easily be carried out in any standard classroom with a minimum of equipment. The response to the program has been excellent, both from pupils and teachers who have been involved.

The basic premise of the Youth Education Section is to provide an opportunity for children to think and acquaint themselves with plants and the growing things around them at an early age so they can cultivate and nurture these thoughts throughout their entire lives. If this opportunity isn't presented at an early age, they seldom grow up with any regard for the miracles of nature going on around them. In these days of air pollution and ecological awakening, there is an ever increasing need for people who understand and respect the benefits from having an abundance of plant materials in their lives. As we reach more and more youngsters who understand the basic ideas of how and why plants play an important part of their lives, the goals of the Arboretum can be realized.

Ronald Call is a young horticulturist who came to the Department two years ago from Monrovia Nursery.

Annual Report of the California Arboretum Foundation

Because of concern for the environment, the ecology and the energy crisis, public participation in the Arboretum has increased threefold. Correspondingly membership in the California Arboretum Foundation has increased from 1500 in May 1973 to 2400 in May of 1974.

There have been many new innovations adopted this year: modernizing the logo of the Foundation through the kindness of Robert Bullock, Instructor of Commercial Art and Design at Citrus College. John Cantreras, a student, designed the logo and Carrie Harbicht, a student, designed the new brochure. Mr. Roy Murphy, a freelance professional photographer took the pictures for the brochure. Their time and help were all donated for which we are extremely grateful. This project was chaired by Alice Douglas. A marvelous new informative Newsletter has been introduced, entitled "Lasca News," edited by Alice Frost Douglas. It is published six times a year by the California Arboretum Foundation to keep the membership abreast of the many happenings throughout the busy year.

The Foundation co-sponsors several flower shows every year with different horticultural societies and organizations. On May 18th and 19th a "Spring Extravaganza and Horticultural Field Day" will be held in conjunction with many of these groups and local Garden Clubs making a meaningful horticultural and educational experience for all. This first -time event is co-sponsored by the Foundation and the Los Angeles State and County Arboretum and will encompass exhibitions by the societies, demonstrations on plant care, growing and propagation, a question and answer booth, and an Open House of the research laboratory, greenhouses and a sale of Arboretum plant introductions.

Many events filled the year for the Foundation and its members. The Herb Society of America held its National Meeting in June and the Foundation Board served as hostesses and served refreshments for a Renaissance Luncheon held in the Mall on June 15th. On Saturday morning, June 30th, the first Hugo Reid Roundup was held for members and their families in the courtyard and around the Hugo Reid Adobe. A typical early-California breakfast was served to 400 guests. Fishing and guided tours were enjoyed by all who attended.

A 25th Anniversary Party for all members was observed on the night of July 13th. An elaborate cake was served to all our invited guests along with punch. The second "Queen Anne Frolic" was held on September 28th under the chairmanship of Alice Coloumbe. It was a very festive occasion with dining and dancing on the Mall, rides

in vintage cars, horse-drawn carriages, and tours through the Queen Anne Cottage. Over 800 members and their guests attended, and the party was sold out the week previous. In cooperation with the Creative Arts Group of Sierra Madre, a Garden and Art Show was held in the Demonstration Home Gardens, October 21st and 22nd. The Foundation hosted a luncheon and program for the Pasadena Arts Council in October. On December 21st, a Christmas Party Luncheon was held for the staff and to honor the retiring staff members of the Los Angeles State and County Arboretum. These included Glenn Hiatt, assistant director, Gertrude Woods, chief of the education division, Joyce Day, secretary to the director, Carl Roth, utility tractor operator, and Jess Tomory, Sr., equipment maintenance man. On January 22nd, an Open House was held in the new Las Voluntarias Headquarters for members of the Board of Trustees and the staff of Los Angeles State and County Arboretum.

A field trip was made to the U.C.L.A. Japanese Gardens and the Botanical Gardens of the University of Southren California at Los Angeles on March 17 by members of the Foundation. A guided tour by Dr. Mildred Mathias proved to be very informative and enlightening. Two field trips this year to the Channel Islands by members proved to be so popular that they will be repeated next year.

The Fourth Annual Baldwin Bonanza, with Mary Gerry serving as chairman, was held on April 7th with a preview for members and their guests held on the Saturday evening before. Over 800 guests attended this special preview.

The two supporting arms of the Foundation are the Board of Trustees and The Las Voluntarias. Without an effective governing body, and an active volunteer organization, the Foundation would cease to exist. Besides the man volunteer hours the Board of Trustees has offered this year, an active financial committee has been established to help aid in this aspect with regard to funding capital projects of the Arboretum. Committees are being formed to help in the preparation of the "Hall of Environmental Education," which is now in the planning stages; with construction, hopefully, to start within the next two years. The capital projects completed this year have been the new Entranceway, the Information Center, and the Meadowbrook area.

Las Voluntarias grew to a strong 185 members in 1973. Forty-two of sixty-four Provisional Members completed the required orientation to become active members at the annual meeting in January 1974. Our Auxiliary Organization, "Los Ayudantes" has a roster of eight men. These people working together contributed over 25,000 hours to almost every facet of the Arboretum and Foundation.

Extensive field-leader training was given to 18 ladies who have joined the ranks of our 31 experienced leaders. Even though it seemed for a while that the curtailment in school busing might cut down on the numbers of field trips, no such thing has occurred. Volunteers contributed 918 hours in the performance of guided tours. In addition, a committee is studying the feasibility of taking programs in history, nature or ecology to nearby schools. Indeed, a few pilot programs were given.

Another "Storytelling Hour" was held during the summer. Forty-five children, aged 4 through 7 attended.

Besides guided tours, volunteers in the history section were responsible for keeping the depot open four days a week, research, special cleaning and arranging flowers in the historical buildings, decorating the buildings for Christmas, and hostessing many special events, one of these events being the Annual Southern California Symposium Conference of California Historical Societies.

Help has been given in the Children's Education Section in the form of preparation and assistance in the classes, enabling more children to take advantage of the services there. Over 900 Arbor Day packets were assembled and mailed to schools in Los Angeles County. These were followed with a tree for planting, donated by the Arboretum, if requested by the school.

Besides planting and caring for the Garden for All Seasons, Las Voluntarias have a greenhouse of their own where they grow plants for sale in the Gift Shop and at the "Baldwin Bonanza." Auxiliary help needed in the Arboretum greenhouses was also contributed. Volunteers worked 700 hours in the Herbarium. Regular help was also given in the research department.

Volunteers made it possible to kep the Arboretum Library open during the month of August when there was no professional staff available. They now assist there on a regular basis.

The California Arboretum Foundation Gift Shop is staffed by members of Las Voluntarias on week days. The craft committee keeps the Gift Shop supplied with saleable items. They also stock a popular booth at the "Baldwin Bonanza."

Preparing California Arboretum Foundation and Arboretum materials for mailing has become a major operation with the astounding increase in membership. This job is ably expedited by volunteers. They also assist the Foundation staff with typing. The Information Center is regularly staffed by volunteers five days a week from 10:30 a.m. to 1:00 p.m. and on some additional afternoons.

Members prepared refreshments and acted as hostesses for many special events. They gave 502 hours toward making the Foundation-sponsored Queen Anne Frolic the huge success it was.

In January of this year we were all greatly saddened by the sudden death of Mr. George Spalding, horticultural consultant for the Los Angeles State and County Arboretum. George was appointed superintendent of the Arboretum in 1949 and held that position for many years. He was loved by everyone at the Arboretum, and to all who came in contact with him. He had a special interest in Australia and loved to travel in that country. Two members of the Board of Trustees, Mrs. Viola Bruckner and Mr. Donald Camphouse, also passed away suddenly during the year. They are sorely missed by all who knew them.

A program of Foundation-sponsored Sunday-afternoon lectures and Sunday-morning walks have been very well received. In 1974, there will be a total of 11 walks and 12 lectures. The mini courses have been expanded to 15 for 1974.

The Foundation office under the direction of Dolores Hubbell, executive secretary, has become increasingly busy with all the activity of the many events and classes. The staff includes Hilda Saderman, membership secretary, Betty Seliger, membership clerk, and Ruby Miller, who works in the gift shop.

The Los Angeles State and County Arboretum represents an ideal opportunity to provide a beautiful experience for the many citizens of the community. Through its public service programs, it has created an interest in all topical and botanically related subjects. It is the people that enable the California Arboretum Foundation to continue its endeavors in helping support the Los Angeles State and County Arboretum and in return truly makes the Arboretum, "A PLACE FOR THE PEOPLE."

—Cecelia R. Grivich, *President*

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CALIFORNIA ARBORETUM FOUNDATION

APRIL 7, 1974

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Bennet, Mr. and Mrs. William S.
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Bennett, Mr. and Mrs. Hugh W.
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Davenport, Philip
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Davis, Ms. Barbara
Davis, Mrs. David M.
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Folker, Theodore
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Haverstock, Mr. and Mrs. Earl F.
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Haynes, Mr. and Mrs. Laramee
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Hoertig, Mr. and Mrs. Richard K.
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Photo by William Aplin

An Arboretum is for people . . .

Many of the educational classes at the Los Angeles State and County Arboretum are concerned with the study of the ecosystems that make up our natural environment. Birds, plants, and man are parts of an ecosystem.

This young hummingbird, not yet ready to fly, is perching on a branch of a flowering peach tree. Soon, it will start feeding on aphids and other insects that feed on and destroy plants man uses for food.

Understanding this relationship and the many other relationships that exist within ecosystems helps us to make intelligent decisions on how we use our limited natural resources.

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BOOKSHELF

New acquisitions to LASCA Plant Science Library

THE CALIFORNIA CHAPARRAL: an Elfin Forest, W. S. Head. Naturegraph, Healdsburg, Ca. 1972. 96 p. Illustrations.

GUIDE TO THE LITERATURE OF THE LIFE SCIENCES, 8th ed., Roger C. Smith and W. Malcolm Reid. Burgess, Minneapolis. 1972. 166 p.

A GUIDE TO THE MEDICINAL PLANTS OF THE UNITED STATES, Arnold and Connie Krochmal. Quadrankle, N.Y. 1973. 259 p. Illustrations.

HANDBOOK FOR THE HOME, U.S. Dept. of Agriculture. Washington, D.C. 1973. (Yearbook of agriculture, 1973) 388 p. Illustrations.

JOHN EVELYN AND HIS TIMES, Beatrice Saunders. Pergamon Press, Oxford. 1970. 203 p. Illustrated.

PHARMACOGNOSY, 10th ed., George Edward Trease and William Charles Evans. Williams & Wilkins, Baltimore. 1971. 795 pages.

STREPTOCARPUS; an African Plant Study, O. M. Hilliard and B. L. Burtt. Univ. of Natal Press, Pietermaritzburg. 1971. 410 p. Black and white and color illustrations.

TRACE METALS AND METAL-ORGANIC INTERACTIONS IN NATURAL WATERS, Philip C. Singer. Ann Arbor Science, Ann Arbor, Mich. 1973. 380 p.

VEGETABLES IN SOUTH-EAST ASIA, G. A. C. Harklots. Hafner, N.Y. 1972. 525 p. Illustrations.

WEEDS, Alexander C. Martin. Golden Press, N.Y. 1972. 160 p. Color ilustrations.

WILD FLOWERS OF THE UNITED STATES. Vol. 6. The Central Mountains and Plains. Harold William Rickett. McGraw-Hill, N.Y. 1973. 3 vols. Color photographs.

The Pacific Tropical Botanical Garden in Kauai, Hawaii, now in its fifth year, has announced its first publications. They are: LIST AND SUMMARY OF THE FLOWERING PLANTS IN THE HAWAIIAN ISLANDS. Harold St. John, Professor of Botany Emeritus, University of Hawaii. 1973. 519 p. $22.50

LIMU, An ethnobotanical study of some study of some edible Hawaiian seaweeds. Isabella S. Abbott, Professor of Biology. Stanford University and Eleanor H. Williamson, Assistant in Anthropology, Bishop Museum. 1974. 24 p. $1.00

Both may be obtained from the Pacific Tropical Botanical Garden, Lawai, Kauai. Hawaii 96765.

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FOR MEMBERS OF THE C.A.F.

HUGO REID ROUNDUP

AUGUST 23, 1974

6 pm to 9pm

Call 447-8207 for reservations

ARBORETUM WEATHER

Long. 34d 08' 48" N.
Lat. 118d 02' 59" W.
Elev. 571.28 ft.

Weather season:
Oct. 1 to Sept. 30

	Mar.	Apr.	May
Average daily maximum temperature	70.4	78.5	77.2
Average daily minimum temperature	48.0	48.1	52.0
Highest temperature	85	94	91.
Lowest temperature	39	43	44
Number of clear days	12	24	9
Number of partly cloudy days	6	3	12
Number of cloudy days	9	4	6
Rain during this month	4.75	.44	.10
Total rain since Oct. 1st	16.93	17.37	17.47

PITTOSPORUM NAPAULENSE (COVER)

This handsome evergreen shrub, native to India, was introduced by the Arboretum in 1968. It will grow in most soils and climatic conditions found in Los Angeles County. It develops into a shrub or small tree 12' high to at least 8' wide at maturity. The common name, "Golden Fragrance," aptly describes the numerous clusters of sweetly fragrant yellow flowers that appear in April.

Botanically, the leaves are lanceolate, elliptic or obanceolate, entire, petioled, alternate, crowded at end of branches, glabrous, dark green, glossy, leathery. Infloresences are greenish-yellow, globular, massive, mostly terminal, quite fragrant.

This species should be planted in full sun and watered moderately. Pruning should be done after flowers appear to encourage the rounded shape of the shrub. No special fertilization is required and there are no particular insect pests or diseases that attack the plant.

Pittosporum napaulense is one of the very dependable plants that has found its way into the Southern California landscape.

Calendar

July, August, September

ARBORETUM, Arcadia

July 4, 5, 6, 7 — 9 to 5 p.m.
Cactus Show*
Presented by the Cactus and Succulent Society of America

July 7 — 10 a.m.
Sunday Morning Garden Walk*
"Historical Buildings"
Patricia Warren, historical curator

July 12, 13 — 9:30 a.m.
Bonsai Congress International Meeting

July 14 — 2 p.m.
Sunday Afternoon Lecture*
"Kitchen Herbs"
Dr. Glenn Walker, Herb garden chairman, Herb Society of America

July 27, 28 — Sat., 1 to 5 p.m.
Sun., 10 to 5 p.m.
Begonia Show*
Presented by the San Gabriel Valley American Begonia Society

August 11 — 10 a.m.
Sunday Morning Garden Walk*
"Displays and Greenhouses"
John Provine, Arboretum horticulturist
*Sponsored by the California Arboretum Foundation

August 23 — 6 p.m. to 9 p.m.
Hugo Reid Roundup*

DESCANSO GARDENS, La Canada

July 27, 28 — 3 p.m.
Concert on the Lawn**
Glendale Community Symphony
Wesley Cease, conductor

September 21, 22 — 10 to 5:30 p.m.
Bonsai Show**
Presented by the Descanso Bonsai Society
**Sponsored by the Descanso Gardens Guild

SOUTH COAST BOTANIC GARDEN, Palos Verdes Peninsula

August 22, 23, 24 — 8 to 5 p.m.
Costa Verde District Garden Clubs Flower Show Judging Course. Presented by Costa Verde District Garden Clubs.

September 27, 28, 29 — 8 to 5 p.m.
Costa Verde District Garden Clubs Flower Show Judging Course. Presented by Costa Verde District Garden Clubs.

BIRDWALKS

DESCANSO GARDENS, La Canada

2nd and 4th Sunday of each month at 8 a.m.
Sponsored by San Fernando Audubon Society

SOUTH COAST BOTANIC GARDEN

3rd Wednesday of each month at 8 a.m.
Sponsored by South Coast Botanic Garden Foundation

1974
VOL XXIV
No. 3
September

Tasca Leaves

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EX-OFFICIO: Francis Ching, Director; Roy Ito, Assistant Director, Frank Simerly, Assistant Director.

September
1974
Vol. XXIV
No. 3

Lasca Leaves

Published quarterly by the California Arboretum Foundation, Inc., for the Department of Arboreta and Botanic Gardens of Los Angeles County.

LOS ANGELES STATE & COUNTY ARBORETUM

DESCANSO GARDENS

SOUTH COAST BOTANIC GARDEN

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Editor
Donald S. Dimond

Cover photo by Francis Ching.
Photos on pages 76, 77, 86, 90, and 99, by William Aplin

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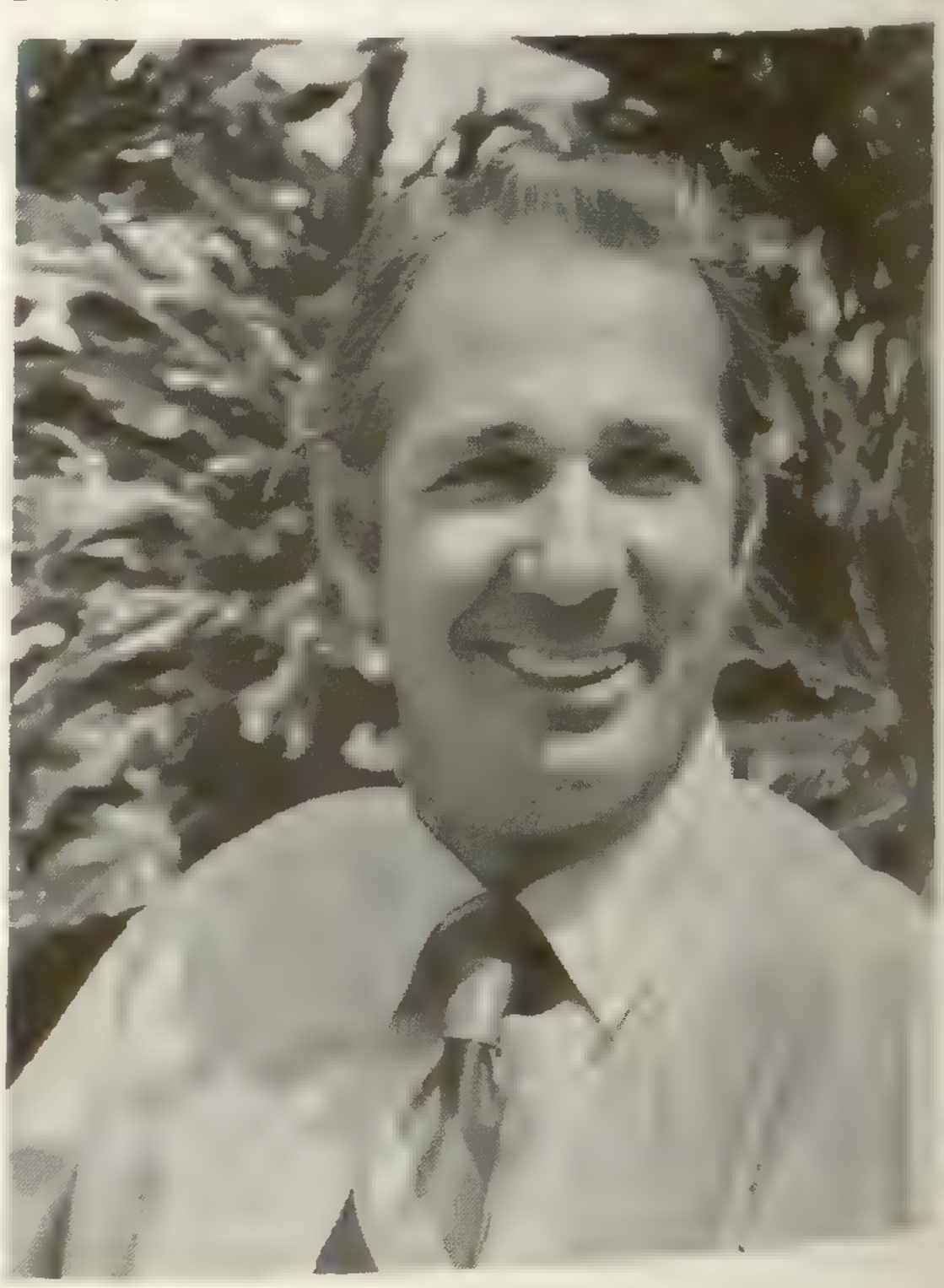
department notes

ASSISTANT DIRECTOR APPOINTED

Frank Simerly, a veteran of twenty-three years of service in the County of Los Angeles has been promoted to the position of Assistant Director, Department of Arboreta and Botanic Gardens. In naming Frank to the newly-created position, Francis Ching, director, was responding to the need to coordinate more closely the horticultural, botanical, research and development programs conducted within the Department's expanding facilities which include the Los Angeles State and County Arboretum, Descanso Gardens, South Coast Botanic Garden, and test stations at Lux Arboretum, San Jose Creek and the High Desert Arboretum.

Frank's primary task will be to coordinate the horticultural efforts of the Department's facilities and to direct the orderly development of the gardens. He will also act as liaison with the citizen supporting organizations: the California Arboretum Foundation, Descanso Gardens Guild, the South Coast Botanic Garden Foundation, and the Southern California Camellia Council. He will work with the other Los Angeles County departments such as the Planning Commission on their General Plan; the Road Department in highway planting design and recommendations; the Flood Control District, and others that might require expertise in the field of horticulture. Frank will spearhead a new program to protect heritage trees throughout the County. Gardener training and developing of standards for the field of gardening will receive his early attention.

Prior to his four years of service as superintendent of the Arboretum, Frank was assistant superintendent at Descanso Gardens. There he developed a training program for the Department of Public Social Services recipients and was responsible for many garden innovations. Frank also served as head of the Arboretum information section during its formative years. School field trips and tram tours were developed during these early days under his direction. He has written many articles and brochures and contributes regularly to LASCA Leaves.



FRANK SIMERLY

Through the years, he has been active as lecturer and teacher in the field of horticulture in the classroom, in workshops, and in the series of Sunday morning walks. For the past ten years, he has conducted a home horticultural class in conjunction with the Pasadena City College Community Services Division. He is active in the Horticultural Advisory Committee of La Canada Beautiful and Keep America Beautiful, La Canada

Branch, as well as the International Plant Propagators Society.

Frank is a native of California and resides in La Canada with his wife, Pamela, and son, Frank E.

NEW SUPERINTENDENT

John Provine, horticulturist at the Arboretum for the past five years, was appointed superintendent on August 15 by Francis Ching, Department director. John succeeds Frank Simerly who was named an assistant director on the same date.

An alumnus of California Polytechnic State University, Pomona, where he earned a degree in ornamental horticulture in 1965, John first joined the Arboretum in 1958 as a part-time student worker. Following completion of his academic training, he became a full-time employee, starting as a grounds maintenance helper. Within six months his Arboretum career was interrupted by two years of military service as a survival instructor with the U.S. Marine Corps. In this capacity, he had the opportunity to utilize his horticultural knowledge, first by establishing a tropical greenhouse at the Marine Corps base at Cherrypoint, North Carolina, and then using the greenhouse to train servicemen in the recognition of tropical flora so that in a survival situation in any area of the South Seas they would be able to differentiate between edible and poisonous plants. His superiors were so pleased with the program that he was sent out to lecture on the subject at military installations in the area.

John returned to the Arboretum in January of 1968 as a grounds maintenance man and was promoted to nurseryman two months later and then to head nurseryman. He was reclassified in 1971 as a horticulturist due to increasing responsibilities. Over the past several years, John has been increasingly active in the Department's education and public service programs. He has taught regularly in the popular minicourse series, specializing in classes in container gardening and the making of terrariums. He also serves each year in the Sunday morning walks and Sunday afternoon lecture series and is the chief organizer and producer of many Department-sponsored special events, notably the highly successful Baldwin Bonanza of last April. These varied activities have given him the opportunity to gain a close view of the

JOHN PROVINE

overall operation and direction of the Arboretum apart from its horticultural aspects, and this experience, together with his administrative training—during his studies at Cal Poly he took time out to get an A.A. degree in business administration at Pasadena City College—can be expected to be of great value in his new role as superintendent.

John is a past president of the International American Begonia Society, a past president of the San Gabriel Branch of American Begonia Society, and is today a member of the board of directors of the international organization.

Mrs. Rodney Rood, the new president of the Descanso Gardens Guild.

NEW PRESIDENT

The new president of the Descanso Gardens Guild, Mrs. Rodney Rood, is an outstanding civic leader who brings to the Guild years of experience in community work. She has worked for La Canada-Flintridge Chapter of the Orthopedic Guild for 15 years; has served on the Board of the Crippled Children's Guild for the past four years; and has been active in the local PTAs when her two sons were in school. She has served on the Board of the Junior Red Cross, was Resident Campaign Chairman for Community Chest and United Crusade Drives, and has been active in the Flintridge Chapter of the National Assistance League. For many years she has taught a Sunday school class at the Hollywood Presbyterian Church. Mrs. Rood has been associated with the Descanso Guild for the past five years and has served as chairman for three of the annual Christmas shows.

For her outstanding service to the community she was one of the first to receive a Les Tupper Award, a top honor in the area in which she lives.

Mrs. Rood and her husband have lived in La Canada for 27 years and are looking forward to the wedding of one of their sons this fall. Mr. Rood is an executive with the Atlantic Richfield Oil Co.

Mrs. Rood succeeds Mrs. John C. Crowley who served as president of the Guild for five years. Mrs. Crowley has recently received her law degree from Loyola University and has just taken the State bar exams. She still finds time to serve on the Descanso Gardens Board of Trustees.

SOUTH COAST

A nine-acre landscaping project at South Coast Botanic Garden that was conceived in March of 1973, had plans approved the following June, plant propagation begun in July, and soil preparation in August, is now complete. It is an excellent record, considering all that was involved. The objective was to reduce a 14-acre spread of hybrid Bermuda lawn into nine acres of ground covers, thereby providing color, a demonstration area for the public, and a considerable reduction in maintenance costs.

Once the plans submitted by landscape architect Frederick Lang were approved, work began with the assembling of propagation materials and volunteers from local garden and women's clubs who would assist the staff in producing the 250,000 plants required for the job. Principal use was made of Arboretum introductions: 'Snow White' and 'Burgundy Mound' Trailing South African Daisies (*Osteospermum fruticosum*), and 'Sunburst' and 'Sun Gold' hybrid gazanias (*Gazania splendens*). Periwinkle donated by Ota Nursery, coyote bush, ivy geranium, agapanthus, and day lilies donated by the well known hemerocallis hybridizer, Quinn Buck, of Arcadia, rounded out the list.

Before this splash of color could be brought to light, however, it was necessary to remove the Bermuda, a process involving numerous sprayings, rototilling, and soil amendments. The result of all this work has been a happy one, all objectives having been achieved and, judging from comments received, the public delighted.

PLANT PORTRAITS

SYCAMORE FIG

Leonid Enari

In the small village of Matariya, a few miles from Cairo, stands a large tree showing signs of extreme old age but still defying the future. Under its shade, if one is to believe a popular legend, Joseph and Mary with the infant Jesus, rested and took water from the nearby well during their flight to Egypt in 4 B.C. The tree is a sycamore fig (*Ficus sycomorus*).

With its large size, dense spreading head and light bark, the sycamore fig is one of the most striking and most colorful trees of the continent of Africa. Palmer and Pitman, in their Trees of Southern Africa, mention the giant sycamore fig trees growing in the Mkuze Game Reserve in Zululand, trees so tall and wide the sun does not penetrate the dim green world below their branches. Some, they say, have a trunk circumference of 40 feet.

The bark is yellow, brown or, rarely,

Twenty years of growth! The sycamore fig growing on Tallac Knoll as it looks today and as it looked in 1954 when it was being examined by Los Angeles County Supervisor John Anson Ford (left) and Arboretum director, Dr. Russell Seibert.

white, and sometimes mottled. The outer bark often peels in small papery flakes.

The wood is soft and porous, but nevertheless very durable. Mummy-cases made of it over 3000 years ago have been found still in good condition in Egyptian tombs.

The leaves are ovate (egg-shaped), equilateral, entire, somewhat wavy, up to 6 inches broad, stalked, mid-green, shiny, and rough to the touch.

The fruits are globular, depressed, about 1 inch in diameter (larger in cultivated trees), densely hairy, green, yellow or pink in color, and carried either in dense branched clusters on the main branches or singly in the axils of the leaves. Originally, those trees bearing axillary figs were separated as *Ficus gnaphalocarpa* (Miq.) A. Rich, but they have now been included in *Ficus sycomorus* L.

All the species of the figs have fruits, or more properly, "fruits" with the same structure—a fleshy receptable containing hundreds of tiny male and female flowers which are pollinated by insects entering the receptable through a small opening at the top. This opening is known as the ostiole.

The pollination of the sycamore fig in the natural habitat has been studied by Professor J. Galil of the University of Tel Aviv in Israel. According to his account, pollination is effected by a small wasp, *Ceratosolen arabicus*. When the female flowers in a fig mature, the scales which seal off the ostiole part slightly allowing impregnated female wasps to enter, lay their eggs, and die there. The new generation that emerges from the eggs completes its life-cycle in about five weeks, which is immediately after the male flowers have matured. The young males appear first and pierce holes in the galls, which have meanwhile formed around the female insects in order to fertilize them. Because the ostiole has closed again, the males begin eating holes through the outer wall of the fruit in the zone immediately below the ostiole, which is where the male flowers are attached. This causes the pollen sacs to rupture. At this stage, the life cycle of the male wasps is completed and they die. The females, however, exit through the holes eaten by the males carrying pollen on their bodies and enter the next young fig by the slightly opened ostiole, so pollinating the young flowers inside.

The sycamore fig has been an important article of food among the people of the Near East since the very dawn of civilization. However, since the figs are of inferior quality they are used mostly by the poor who cannot afford anything better.

It is customary for the cultivators of the sycamore fig three or four days before gathering, when the fruit is about an inch in diameter, to pare or scrape off a part of the center point, or to make a puncture with a sharp pointed instrument. Unless this cutting or piercing operation is performed on every fig, the fruit will secrete a quantity of watery juice and will not ripen.

The tree can be propagated by cuttings of well-matured wood. Two methods are used. One is to plant pieces of branches 3-to-6-inches long in the ground, leaving only the tip exposed and taking care that the ground will not dry out until the cuttings are rooted. Another way is to root cuttings in the nursery and transplant them later.

At the Los Angeles State and County Arboretum a sycamore fig can be seen in P12 atop Tallac Knoll, an area partly devoted to the plants of the Bible. The tree was received from the Los Angeles City Department of Parks and Recreation in January, 1953, was planted in the present location two months later, and has been bearing fruit for several years. The fruit, however, falls before reaching maturity.

Garden For All Seasons

Donald S. Dimond

It goes back to the fall of 1966 when a small group of history volunteers formed a committee that would be responsible for placing fresh flowers twice a week in the Queen Anne Cottage and Hugo Reid Adobe. At the time, it seemed no great problem. The flowers would come from the display garden and other sections of the Arboretum and, maybe, from a few private gardens. As it turned out, the principal source proved to be the nearby McCaskill Nursery whose co-owner just happened to be the committee chairman, Mrs. Billie McCaskill.

But unforseen problems arose. As the Arboretum grew, so did the demand for fresh cut flowers. They were needed for important luncheon meetings and for a variety of special events. And, it was nice to have them available every month of the year, even though that was beyond the capacity of most gardens. Then, the display garden was temporarily removed to make way for the new meadowbrook project; no more flowers would come from that source for awhile. A few years later, the volunteers—or Las Voluntarias as they had become known under their corporate title — had an idea and an opportunity at the same time. Chewing the matter over one day at an informal meeting, the idea popped out. Why not grow our own? The question seemed as obvious as it was logical. Like many good ideas, the real question was the implementation. Manpower and land were the immediate needs. It happened that about three-quarters of an acre of land paralleling the west side of the road leading to the begonia and orchid greenhouses had been more or less fallow for some time. It was available.

In October, 1972, John Provine, then chief horticulturist at the Arboretum, asked Jane Buck, chairman of the volunteers' flower-arranging committee and a three-year member of the California Arboretum Foundation, to set up the garden. He gave her three weeks to do the job. It was just as well; Jane was eight-months pregnant at the time. But, having lived on a farm all her life, she knew how to get a horticultural job done. With help from the Ortho Chemical Company, which donated flowers, vegetables, fertilizers and other materials, she laid out the garden, deciding what and where to plant. The timing was just right. The day after helping to plant the first flowers she had her baby. Occupied today with motherhood, Mrs. Buck has had to limit her volunteer activities. But, she still arranges flowers each week in the Demonstration Home Gardens with the assistance of a committee of five, only one less than the number of people she had helping her in laying out the entire Garden For All Seasons.

Anne Lanselle took over after Jane Buck had her baby. At the time, it was intended that the garden be just a cutting garden, judiciously planted so that fresh flowers would be available the year round. But if flowers could be grown throughout the year, why not vegetables? Southern Californians could come to the Arboretum any time of the year and see flowers and vegetables growing side by side, the esthetic and the practical in perfect compatibility. So, during 1973, Anne

Lanselle led the development of the garden and it was she who got the vegetables going in addition to furthering her interest in planting one-of-a-kind of rare or unusual plants.

In January of 1974, Louise Phelps and George Jack took over as co-chairmen. Louise had been a Foundation member for eight years and had taught classes in the Youth Education program along with

George Jack is a retired telephone executive who did his first gardening while he was living in Hempstead, Long Island. As a daily commuter to Kennedy Airport where he was overseeing the business aspects of a highly complicated telephone installation, he had plenty of time to plan his watering and planting schedules. George joined Las Voluntarias in January, 1973, and became at

George Jack and Louise Phelps, co-chairmen of Garden For All Seasons.

Diane Martin when Gertrude Woods was head of that section. Gertrude later became chief of the Education Division. She retired last year. Diane is now teaching a vegetable gardening class in the Department's Adult Education-Pasadena City College program and maintains, with the help of Vito Amato, another volunteer, the vegetable plots located just north of the Garden For All Seasons that are used in her class work. Louise credits Gertrude Woods for her basic training in gardening. This experience, plus experiments in her own garden and classes with Lydia Birt Williams, member of the Adult Education teaching staff, have made her a very knowledgeable gardener.

the same time a member of the Foundation, as are all members of Las Voluntarias. George Jack and Louise Phelps speak softly, work hard, and lead what must be the most democratically run volunteer group ever brought together. There are about 20 workers on the roster, 14 of them active. Sixty percent are women. For all practical purposes, they can do anything they want. No one is "assigned" to any particular task. This seemingly *laissez faire* policy is not so inefficient as it sounds. There is so much to do, and so much to do that obviously needs being done, that if one person wants to water, another to weed, and another to plant, all can be satisfied to

THEN . .

NOW . .

the benefit of the garden. In any case, no one gets any direction unless it's asked for. The workers, for this is what they are, average one day a week, four hours a session. Both George and Louise are happy to "pay to work," as George has observed, more hours than this. It is a little more difficult for Louise because she now lives in Long Beach. But to balance it out, George represents Louise at the Las Voluntarias board meetings and takes notes.

Any of the volunteer gardeners can suggest something to plant and, if it's possible, John Provine will get it. Very little seeding is done; most of the plants come in pony packs. During lunch, notes are made in a looseleaf binder on the work done during the morning — what was planted, how new plants are doing, what is blooming, and so on. It is a fascinating record. Reviewing it one learns that smog ruins daffodils, that the peacocks are the biggest problem — flying into the gloriosa daisies and nesting in the calendulas — and that watering is a problem because, first of all, two hoses have to be dragged out, the watering is practically all ground watering, which is time consuming — there is very little overhead watering — and the area, being partial adobe and never before planted, is hard to work and slow to absorb water. The railroad ties put in last fall by Frank Simerly, then superintendent and now an assistant director, helped to make watering easier.

The entries in the notebook reflect the progress of the garden and the cooperation with the staff. The Garden For All Seaons is totally maintained by the volunteers, but when help is sought it is given. An entry on June 29, 1973, reads: "Bill Neubauer (staff nurseryman) showed us how to plant seeds. Helichrysum, etc." The April 10 entry reads: "Removed one row of daffodil bulbs on path edge of plot N in order to widen path to uniform width. Left one row of mixed gladiolus bulbs next to dianthus." And, later in the morning: "Started restaking with permanent 2" square stakes at corner of all beds. Obtained 100 48" stakes from shop and sledge-hammer to pound them in. Larry Geerer (staff grounds maintenance man) came to help install them. Pounding in the hard dirt broke and splintered the stakes, so Larry got a posthole digger. This was very slow work, and we only finished plots P., N., and O."

Asked why he works in the garden, George Jack said, "Of course, like all of us, I enjoy gardening. But I also enjoy the companionship — we have a very congenial group working here — and I'm retired and this keeps me in good shape." In how good a shape is illustrated by this partial entry of November 10: "Removed rocks and turned over soil in beds 1 and 2. Lots of rocks and hard clods to break up . . . Added 2 bails of peat moss to bed 1 and raked it in. Watered with rain-bird for 1 hour. HARD WORK!"

The ratio of flowers to vegetables in the Garden For All Seasons is about four to one. Harvesting the vegetables can be fun along with the care. An entry of last May 3rd reads: "Harvested 2 dozen big round radishes from MB3." And on May 7th (workdays are Tuesday and Fridays): "Harvested beets which were 3-4" in diameter . . . vegetable garden full of slugs, renovated the soil, put snail bait . . . planted eggplant, 3 Mission Bell and 2 pepper plants."

Today, the Garden For All Seasons provides cut flowers for all Arboretum needs. More, it provides visitors with proof that nonprofessionals can grow a successful garden of flowers and vegetables throughout the year in Southern California. It has become a star educational attraction, an ornament to the Department and to all the dedicated volunteers who created and worked in it.

Educational and Public Service Programs

Tak Niiya

In the Los Angeles area there exists an intense interest in horticulture and gardening as evidenced by the proliferation of garden clubs and horticultural organizations. There are also numerous community colleges and state universities which offer a broad range of courses in the life sciences. Despite the abundance of plant-related organizations and institutions, the Arboretum's educational and public services programs are enthusiastically supported by the public. The Arboretum's success may be attributed to its responsiveness to public demands and interests.

Garden clubs and horticultural organizations generally are restricted in the geographic area and the number of people they can actually service. On many occasions, the focus of these clubs may be too specific (the club may be concerned with only one genus of plants) for the average home gardener. Often these groups do not have the funds to publicize the existence of their services, so in a large community like Los Angeles the majority of the public is unaware of their benefits. Attracting young members can also be a problem if the membership of the club or horticultural organization is well established within a senior age group. Universities and colleges, on the other hand, deal primarily with a younger clientele and therefore have difficulty in attracting older persons while the emphasis of botanical and horticultural courses in universities and colleges are primarily academic rather than practical.

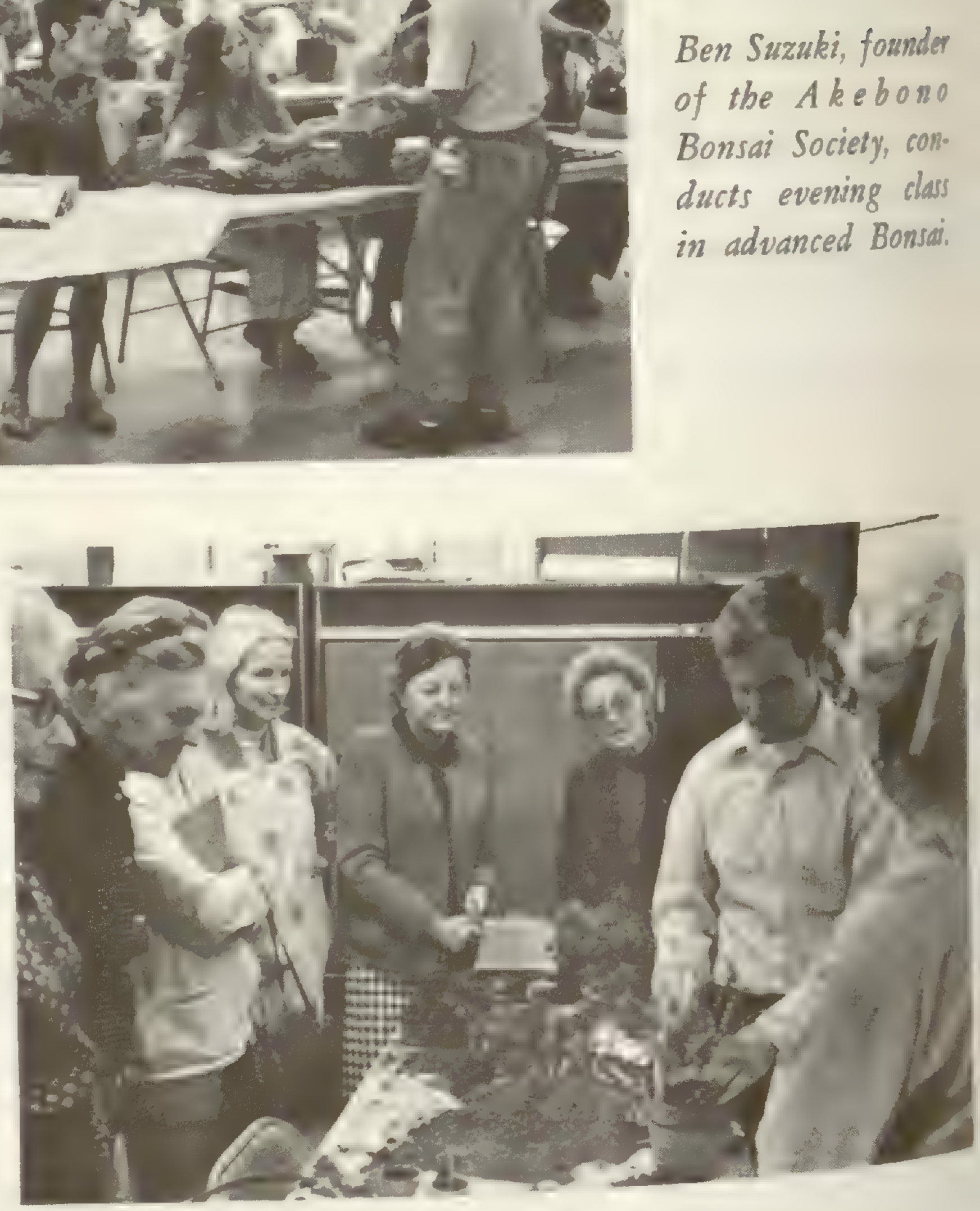
The Los Angeles County Department of Arboreta and Botanic Gardens believes that the Arboretum is for people and has its educational and public services to reflect the needs and interests of the people that live in Los Angeles. In an attempt to meet the public's need for plant information, the Arboretum provides educational services in the form of formal and informal classes and workshops, guided tours, special walks and lectures, garden displays, informational services, and special programs such as an Arbor Day program for schools.

ADULT EDUCATION

The average homeowner has become eager for plant-related information and, therefore, most of the courses in the Adult Education program are planned to meet the horticultural interests and needs of the average homeowner through series of lectures, workshops, and field trips. The curriculum offered in the Adult Edu-

Ben Suzuki, founder of the Akebono Bonsai Society, conducts evening class in advanced Bonsai.

John Provine teaches a very popular mini-course in container gardening.



A morning class in home gardening taught by horticulturist Lydia Birt Williams

cation program is revised annually in accordance with public demand, public response to previous courses, and the availability of instructors and facilities.

Although these classes are designed for the homeowner, a surprising number of teachers, druggists, and doctors attend the thirty-six non-credit classes scheduled each year. Ten of these are morning workshops; the others are evening lectures or a combination of lectures and workshops. Several include one or more field trips. Class size for the workshops are limited to thirty-five students and 1,354 students are registered for the current year. Classes are co-sponsored with community colleges. Registration and supply fees vary by class.

Day & Evening Classes Subject	Number of 3-hour Sessions per class
Beginning Bonsai	16
Advanced Bonsai	16
Container Gardening	16
Environmental Flower Arrangement	16
Herbs	18
Home Gardening Basics	18
Home Gardening, Advanced	18
Home Horticulture	14
Intermediate Bonsai	9
Plant Identification	18
Poisonous, Medicinal, and Edible Plants	16
Sketching and Painting	10
Vegetable Gardening	12

Minicourses

Short and intensified classes emphasizing the practical aspects of a subject have become very popular with home gardeners who want to know more on a specific horticultural subject, and people in the trade who desire a refresher course on problem areas. Small class size gives students the advantage of getting into discussions with the instructor on individual problems. Twenty-three morning and three night minicourses are scheduled. These workshop courses range in length from one three-hour session, to five three-hour sessions. Minicourses are con-sponsored with the California Arboretum Foundation and taught by staff members. Registration is limited to fifteen students and fees vary from twelve to twenty-five dollars. Foundation members receive a 20% discount.

Subjects

Botany I
Botany II
Edible, Poisonous, and Medicinal Plants
Chaparral Plants
Hydroponics: Gravel Culture
Plant Diseases
Indoor Container Gardening
Terrariums
Plant Propagation
Carnivorous Plants and Terrariums
Pruning Trees and Shrubs
Holiday Decorations
Hanging Baskets
California History
Patio Container Gardening
Plant Breeding and Hybridization

YOUTH EDUCATION

The Arboretum, realizing that most schools are unable to provide adequate time or facilities for classes dealing with horticultural and botanical subjects, has attempted to fill this gap by scheduling guided tours for school field trips and by implementing an out-reach service in the form of an Arbor Day Program and a "Taking the Arboretum to the Schools" program. For students interested in horticulture, gardening, and nature study, workshop classes are offered that are not easily obtainable in other institutions. This program is designed to expose the maximum number of children to the ecological values and importance of plant life, so as adults they will have a better understanding and be more prepared to handle environmental problems and will appreciate the value of having a botanic garden in the community.

Scheduled Classes

The Department has a program consisting of workshops and lectures, scheduled the year round for children, ages six to fourteen. During the fall and spring, classes are held after school and on Saturdays. Morning and afternoon classes are held during the summer. There is an education assistant at each garden who is in charge of teaching these classes, and in the summer student teachers provide additional help in classroom instruction. Twelve subjects are taught in all, and seventy workshops are scheduled per year. The Department enrolls nine hundred children in the Youth Education program each year. Contributions of three to five dollars are suggested to defray expenses and 80% of these contributions are collected. This rotating fund is deposited with the California Arboretum Foundation and used for workshop supplies.

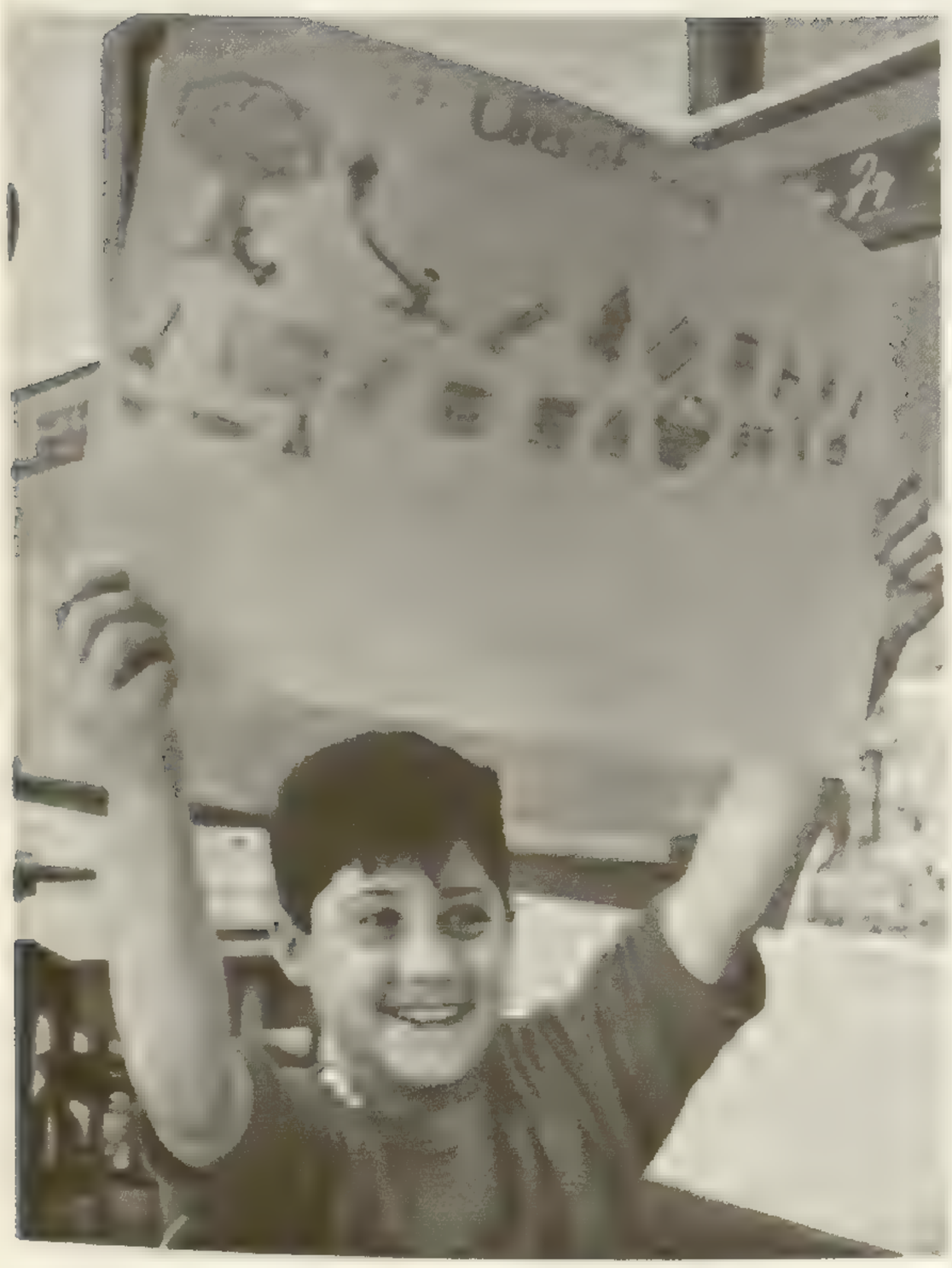
Youth Education Programs

Subjects	Grades	Hours	Sessions
Indoor Gardens	1 & 2	1¼	6
Plant Adventures	1 & 2	1½	6
Exploring Nature	3 & 4	1½	8
Container Gardening	3 & 4	1½	8
Gardening Skills	3 & 4	1½	8
Gardening	5 & 6	2	18
Plant Propagation	7 - 9	2	12
Art in Nature	5 - 7	2	6
Pond Life	5 - 7	2	6
Flower Gardening	6 - 8	2	12
Arts and Crafts in Nature	7 - 9	2½	6
Nature Craft	7 - 9	2	6

Taking-the-Arboretum-to-the-School Program

This program (see previous issue) was developed because of the need by teachers for professional advice on the appropriate cultural techniques for growing plants in the classroom and for growing annuals and vegetables outdoors. In the Indoor Gardening Program, education assistants discuss propagation methods, soils, and the care of plants in the classroom. The Outdoor Gardening Program involves consultation on soil preparation, teaching techniques in the garden, and the simple cultural practices a teacher will need for a successful school garden. Education assistants are available in the morning as consultants to elementary schools and two visits are made to the school for each program.

Tree planting on Arbor Day at the Mayflower School in Monrovia.



The importance of trees to everyone.

—Photo by Walt Mancini

Arbor Day Program

For many years, Arbor Day and Conservation Week were observed separately by schools, city parks, and the Arboretum. Three years ago, with the Arboretum's change in philosophy, the Arbor Day Program was changed to assist the many schools which had requested help in developing a meaningful program for the entire school.

Each participating school receives a resource packet of teaching aids containing relevant information on trees, conservation, and environmental problems. The information in the resource packet is put together and updated each year by the Las Voluntarias Arbor Day Committee. A tree in a five-gallon container is made available on March 1, a week prior to Arbor Day. Fifty-four school districts participated, and nine hundred and eighty-four trees were accepted by schools this year.

Students on field trip to Arboretum enjoy waterfall while learning about aquatic plant life.

School Field Trips

Since its inception, the Department has had many requests from schools for plant science field trips. Since field trips are very popular, they are scheduled well in advance to insure that field leaders are available. As with many public institutions, the Department is always short of permanent staff, therefore eighty percent of the field leaders are specially trained docent members of Las Voluntarias. Without the help of volunteer tour guides the Department's three gardens would not be able to conduct 30,000 children on scheduled field trips each school year. The content of these trips emphasizes man's relationship to his plant environment and the field leaders point out and describe the salient features of the garden to the visiting class. Each fall field leaders at the three gardens have a training seminar to review and introduce new guides to the school field trip program. Ninety percent of the field trips requested are for students of grades three to six, and guide training is geared towards taking upper primary students.

Dr. Leonid Enari leads walking tour of Australian Section at Arboretum.

PUBLIC SERVICES

The public visits the Arboretum for pleasure and to obtain horticultural, botanical, and taxonomic information on plants of all kinds. The information may be of an academic nature or it may be purely practical; the point is that it is available.

Public Tours

Guided tram tours are offered daily at each garden. They give the visitor an overall view of the garden while acquainting him with a little of its history, plant collections, programs, events and services. The tours serve as an introduction to the garden, inviting the visitor to return again and again to examine areas of interest more closely. Approximately 160,000 people take these tours annually. They are free of charge, although passengers are invited to donate to a tram fund.

Sunday Morning Walking Tours

Sunday morning walking tours are for people interested in a more thorough, if leisurely, exploration of a particular section of the garden. The two-hour walking tours, led by staff members, usually take a group to areas not normally visited by the public, such as plantings with interesting highlights, or garden displays that can not be fully appreciated by the public without an explanation by a guide.

Walking Tours

Australian Section
Asiatic Section
North American Section
Camellia Area
Tallac Knoll
Aquatic Gardens
Historical Buildings
Displays and Greenhouses
Herb Garden
Poisonous & Medicinal Plants
Roses & Annual Flower Beds
Native Plants & Flowering Fruit Trees

Sunday Afternoon Lectures

The horticultural lecture program is designed for people unable to attend the regular classes offered at the Arboretum

Sunday afternoon lecture by Frank Simerly, Arboretum assistant director.

or who feel that an afternoon lecture would be adequate for their immediate information needs. Normal attendance for a lecture-demonstration is between 200 and 500. Lectures are on popular subjects regularly inquired about by the homeowner.

Sunday Lectures

Vegetable Gardening
Composting
Foliage Plants
Kitchen Herbs
Propagation
Container Gardening
Turfgrasses & Groundcovers
Lawns & Ground Covers

Spring Extravaganza

Recent programs and activities planned for the public are frequently so successful that they quickly become inadequate to reach the growing number of interested people. This year's first Spring Extravaganza—two horticultural field days for the home gardener—was designed to take care of large numbers of people and to provide practical answers to every conceivable gardening question. During the Extravaganza, demonstration-lectures on vegetable gardening and propagation were presented three times daily and question-and-answer booths were set up covering specific horticultural categories. The Extravaganza had an overwhelming two-day attendance of 28,000 people.

Consultant Service

The Arboretum provides a botanic and horticultural information service that attempts to identify plants and diseases, answer a wide range of horticultural questions, and give general advice. Examples of daily questions are: How can one eliminate wireworms without using toxic ingredients? What went wrong with my Meyer lemon? Can surface roots be cut off from a medium-sized avocado tree? Where can I buy beneficial garden insects? The horticultural consultant, along with other staff members, averages

over 20,000 calls and visits annually. A "Plant of the Week" feature column is published in the Pasadena Star News to inform the public of various outstanding plants currently in bloom at the Arboretum.

Publications

A logical sequence to the hundreds of requests for information from the public is to produce printed materials on some of the more popular subjects. A publications program produces a steady flow of brochures reflecting the results of field and laboratory research. The material is uniformly presented in a form designed to provide the reader with easy-to-understand and easy-to-follow directions. Brochures published recently by the Arboretum are: Home Vegetable Gardening, Insecticides Around the Home, Poisonous Plants of Southern California, Beneficial Insects, A Guide to Pond Ecology, and Green Belts for Brush Fire Protection and Soil Erosion Control in Hillside Areas. Additionally, the Informaiton Center offers monthly calendars, maps, class schedules, and horticultural bulletins.

Library

The Arboretum library contains 20,000 books and subscribes to 525 periodicals in the following subject areas: air pollution, botany, plant breeding, conservation, ecology, floras of the world, forestry, genetics, horticulture, landscape architecture, plant physiology, soil science, and taxonomy. Among the reference items are Bailey's Standard Encyclopedias of Horticulture, and the Gray Herbarium Card Index of Plants. A small rare book collection, copying services, and a file of nursery and seed catalogs are also available. The library is non-circulating but is open for reading and research from 9 to 5, Monday through Friday.

Horticultural Displays

A large number of people visit the Department's three gardens with the intention of gleaning information that will assist them in improving their own surroundings at home. A number of demonstration gardens and displays are specifically designed and developed to aid the homeowner.

The Sunset Demonstration Home Gardens consist of a series of patios designed for homeowners who desire to spend a considerable amount of time in outdoor living. Here, a homeowner can compare different types of construction materials for decking, screens, and shade covers. He can also see a garden work-center, a small greenhouse and a great variety of plants in containers and planters.

Ground Cover, Lawn, and Juniper Displays

A collection of sixty different ground covers, seventy junipers and twenty grasses are labeled and planted for easy comparison. Junipers are a particularly favorite plant for landscaping and yet nowhere else in Southern California can the homeowner see so many different varieties growing side by side. The orderly display of these and the ground covers and grasses makes it easier for the homeowner to make an appropriate choice.

Garden For All Seasons

During the last few years because of the great rise in food prices and public awareness of the need to beautify the urban environment, the cultivation of annuals and vegetables have become popular hobbies with the public. The Garden For All Seasons is designed to demonstrate that blooming flowers and vegetables can be grown side by side throughout the year in Southern California in a manner attractive enough to be used in a front yard flower bed.

Herb Garden

The Herb Garden at the Arboretum covers 1.2 acres and contains about 425 different herbs used principally for adding flavor to foods, for fragrance, and for their real or imagined value as medicine.

The Fragrance Garden is part of the Herb Garden and was designed primarily for the blind. It contains aromatic herbs, plants with fragrant blossoms, and plants with unusual and interesting leaf textures. Blind visitors may walk along a 75-yard path that has a railing on one side and a 3½-foot wall on the other. Along this wall, within easy arm's length, are the plants that make up this garden. Plant names are printed in braille so that blind visitors may identify as well as feel and smell the plants. The Herb Garden is planned and maintained by members of the Southern California Unit of the Herb Society of America in cooperation with the staff of the Arboretum. The Society holds regular meetings at the Arboretum, which are open to the public. Members work in the garden every Thursday.

Orchid and Begonia Collections

The growing of orchids and begonias is a popular hobby in Southern California. The Arboretum orchid collection contains approximately 10,000 plants comprising 185 genera, 1,000 species, and the remainder hybrids. It is one of the largest municipally-owned orchid collections in the country. The begonia family is a very large one, with hundreds of hybrids and species grown all over the world. The begonia greenhouse at the Arboretum contains an outstanding species collection which, like the orchid collection, affords the interested home gardener an opportunity to study and compare with his own greenhouse efforts.

Historical Section

The Arboretum has four buildings of historical value: the Hugo Reid Adobe, the Queen Anne Cottage, the Coach Barn, and the Santa Anita Railroad Depot. The Arboretum grounds were once the homesite of the famous Rancho Santa Anita. Many of the buildings were already on the grounds when the Arboretum was established. The buildings were renovated and the Department has attempted to provide these buildings with the furnishings suitable for their time period. All artifacts belonging to the Department are identified and accessioned. The historical curator, with the aid of volunteers, offers guided tours to school groups, provides information to visitors relating to the history of the buildings and land, besides maintaining educational displays. Tours are available through the historical section by appointment.

CONCLUSION

The growing of plants can be enjoyed by everyone and the ability to supply the educational means for fulfilling this interest is a great challenge. We believe that the Arboretum is for the people and we know we must continually evaluate all of the programs in order to meet the needs of the people of Los Angeles. Since the educational programs already offered to the public are sometimes oversubscribed, we must also be ready to grow as well as change. New brochures and leaflets will be forthcoming, emphasis in programs and workshops will be changed, and new horticultural displays of educational value will be constructed to sustain the trust and confidence the people have shown in our efforts to serve them.

A member of the Department's Education Division for 11 years, Tak Niiya was appointed chief of the division last June.

The Queen Anne Cottage

Sandy Snider and Patricia Warren

Many Arboretum visitors are impressed by the architecture of the Queen Anne Cottage and by the fact that the Arboretum, basically a botanical garden, should have historical buildings on the grounds.

The Los Angeles State and County Arboretum is located on what once was a portion of the Rancho Santa Anita, an old Mexican land grant. In 1875, Elias Jackson Baldwin purchased the 8,000-acre ranch from Harris Newmark and built the cottage beside the spring-filled lake. He hired architect A. A. Bennett, who was noted for completing the State capitol in Sacramento as well as being the father of Baldwin's last wife, to design and supervise the construction of the Queen Anne Cottage. Bennett spared no expense in the building or furnishing of the Cottage which was completed in 1881 at a cost of some $45,000. "Queen Anne" was a style of architecture in the United States which combined shingles,

half-timbering and towers. It was popular in California in the nineteenth century. The appellation, "Queen Anne" refers to this style of architecture, not to the English sovereign Queen Anne (1702-1714) or to a type of furniture called Queen Anne.

"Lucky" Baldwin built the cottage as a retreat from the busy life in San Francisco and for his third wife, Jennie Dexter, and their daughter Anita. Jennie died, however, before the completion of the cottage. The Queen Anne Cottage was then used as a guest house for Baldwin's out-of-town visitors while Baldwin himself preferred the adobe, a modern eight-room house at that time, when he came down from San Francisco. All of the cooking was done in the adobe and brought over to the cottage. You will look in vain for a kitchen in the Queen Anne.

When Baldwin died in 1909, his daughter Anita had all detachable integral parts of the Cottage crated and stored in the Coach Barn. In 1948, when the Arboretum was established, the historical buildings, having been neglected for years, were in need of restoration. The beautiful stained glass from England, the white marble fireplaces, the black walnut doors, the tiling for the front hall, and the marble of the outside walkway were replaced to reflect the original charm of the Cottage. A German carpenter who had worked on the Queen Anne when it was first built recalled details of trim, interior colors, and the furnishings with amazing accuracy. Indeed, he had been on hand for the arrival in 1881 of the flowered carpeting, crystal chandeliers, and the long gilt mirrors from San Francisco. Many of the original Baldwin furnishings had disappeared over the years, but with the aid of generous donations these articles were replaced with similar furnishings of the period. Actual restoration of the Queen Anne Cottage began in February, 1952, under the direction of Maurice Block, former curator of the Huntington Art Gallery, and Susanna Bryant Dakin, chairman of the Historical Committee of the California Arboretum Foundation. The work was completed in June of 1953 at a cost of $75,000 in donated funds—nearly $30,000 more than Baldwin originally spent in constructing the cottage. Today as visitors walk around the porch of the Cottage, they can enjoy viewing the fully furnished house.

In the bedroom at the southwest corner of the Cottage is a surprising feature —wall-to-wall carpeting, in use even then. On the early looms all carpets were woven in strips twenty-seven inches wide (this being the length of the old Flemish measuring unit known as an "ell") and then sewn together. Broadloomed carpet is a modern invention. The three-piece bedroom set is of the popular Renaissance Revival style. The standard double bed is six feet long—the massive wood frame makes it look smaller than it actually is. The leather trunk at the foot of the bed was made in California; it is on rollers for easier handling. There is an original marble fireplace in each of the rooms of the Cottage; these were the only sources of heat. They were coal-burning, for Baldwin refused to cut trees for firewood.

Circling the building to the left, the next room on view is the bathroom. The merits of indoor plumbing were still a matter of controversy in 1881—many people believed it unsanitary. Water was pumped through the pipes into the house where it functioned on the principle of gravity, and the waste waters were then piped out of the house to a cesspool. The tin bathtub was lined with zinc to help prevent rust. The crystal chandelier adds a touch of elegance to the modest decor.

Again moving to the left, the study affords a good view of an interesting

landscape painted in oils by H. H. Cross in 1889, showing a bearded E. J. Baldwin, his daughter Anita (who was named for the Rancho Santa Anita), and their mastiffs. The picture also shows the Queen Anne Cottage standing across the lagoon, looking as spruce as it does today, while the two roofs in the background are the Coach Barn and the General Store (no longer standing). This painting hung in Baldwin's San Francisco hotel and was one of the items rescued when the hotel burned in 1898. The artist, a personal friend of Baldwin's, restored the painting after the fire. In the large secretary below the painting are several books printed in the 1800's. Included are Clement Moore's *The Night Before Christmas* (1893), an 1869 Webster's dictionary, and the twenty-nine volume *Encyclopedia Britannica* of 1879. The two stained glass windows are of Keats (north window) and Shakespeare (east window).

Overlooking the lagoon is the music room. The unusual chandelier is made of elkhorn and Favrille glass. The Erard harp (circa 1810) is made of lovely bird's-eye maple with a gold leaf embellishment. The square rosewood grand piano was made by Decker and Son (1856-1862) and on it is the music of the period. Near the door and over the melodeon (a miniature organ) is a 1912 portrait of "Lucky" Baldwin himself (done from a photograph).

The elegant parlor is dominated by the red brocade set of furniture. Complementing the upholstery is the lavender lustre tea set of Staffordshire china. The walnut stereoptican provided unlimited visual entertainment; stereoptican pictures were the predecessor of the modern slide projector. Highlighting the parlor (on the wall over the settee) is a striking oil painting of Jennie Dexter, "Lucky's" third wife. Jennie was sixteen at the time. The portrait next to the fire place is also Jennie—she was only twenty-two at the time, but she had aged considerably due to what was probably tuberculosis. She died at the age of twenty-three. As you finish your circle of the Cottage, notice the stained glass in the entrance door—the welcoming lady is again Jennie Dexter Baldwin.

The formal garden, beautifully restored by members of the Pasadena Garden Club, the deep artesian well which doubles as a decorative fountain, and the giant clam shells brought back by "Lucky" from the Great Barrier Reef, complete the fairy-tale setting of the Queen Anne Cottage.

Patricia Warren is the curator of the historical section at the Arboretum and Sandy Snider is a part-time worker there who has a special interest in early California history.

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Youth Education

Karen Asher

Horticultural education for your child —is it important? I am a little prejudiced, and you who are members of the California Arboretum Foundation must be to some degree or you would not have joined that organization. Maybe if more of us had been exposed to horticulture when we were children our cities would be a little more pleasant to live in today. Certainly an appreciation of healthy growing plants at a young age will help to prevent acceptance of a concrete world as an adult. One of my goals as an instructor is to help students understand the importance of plants in our lives while teaching them how to grow them.

What do your children do when they come to the Arboretum to take a class? In the fall and spring there are four basic gardening and horticulture classes offered: Indoor Gardens, Container Gardening, Vegetable Gardening, and Plant Propagation. In the summer we broaden the program, which I will talk about later.

The Indoor Gardens class is for first and second grade children. This class is our beginning step with the children to introduce them to the world of plants. We discuss, "What is an Arboretum?", "Why are plants important?", "What do plants need to grow?" I have discovered that when students stop to think about these questions they can answer most of them with little help from me. We have three projects in Indoor Gardens: growing succulent cuttings, rooting them and transferring them to a container to be taken home; making a terrarium, which is an enjoyable project for the students and a valuable learning tool, as it vividly illustrates the water cycle; and planting a tree seed. We discuss where seeds come from. This question stumps the students more than any other. I think it is important they do not simply think seeds come in a packet from the store, which was an answer I received once. Watching their seeds germinate and grow, and seeing the roots produced by their succulent cuttings, excites the students and leads to a good deal of bragging and comparing.

Container Gardening for third and fourth grade children shows the children they do not need a piece of land to have a garden. The projects in this class are all grown in some type of container. Forcing bulbs in the fall is an intriguing project. After we tell the students that soil is one of the essentials a plant needs to grow, we turn around and set miniature narcissus in cups containing only pebbles and water. "Where are the bulbs going to get the food they need?" we are asked. At this time we explain exactly what a bulb is and that it contains the food it needs.

Making a coleus hanging basket has proven interesting to me, for I have learned what a tough little plant this is. The students make their own cuttings and although they are told to carefully remove the lower leaves and keep three or four leaves at the top of the stem, things do not always work out this way. When we get ready to put the cuttings in the greenhouse they look as if they have been to battle and I cross my fingers and speak gently to them.

Growing flowering annuals from seed is a third project. When the students

Learning how to make terrariums

Hanging Baskets

Harvest!

plant the seed for their container I always have them plant extra seeds for the flower garden next to our building. I have learned to make this point very clear at the beginning of this project. The first time I had the students do this I didn't explain they were planting extra seed, so when it came time to transplant the seedlings everyone wanted to take all of their seedlings home. When I told them what I had planned to do, they went along with it but they were not too happy about it.

The semester-long Vegetable Gardening class is eagerly anticipated by many of the younger students. This course for the fifth and sixth grade student offers them a chance to plant, raise, and harvest their own 50-square-foot vegetable garden. The students learn how to prepare their soil for planting, what makes a good soil, and why these things are important. Planting day arrives and the fun begins. Students are shown how to plant their seed and are advised not to overplant as this makes for a lot of work when it comes time to thin out the seedlings. For some the temptation not to plant every seed in their pocket is too great, and only when thinning time comes do they see the error of their ways. Fortunately our gardens have been relatively insect and disease free so the harvest is plentiful. Sometimes a little too plentiful. After harvesting three or four heads of lettuce two weeks in a row I hear comments like "My Mom says she doesn't need any more lettuce this week."

After the gardens are planted and begin to grow the students soon learn the three steps to a good garden: weeding, watering, and cultivating. Although I get the usual moans and groans when they realize there is work to do, they do a very admirable job and keep their gardens looking attractive and growing well.

Plant Propagation is the culmination of the gardening classes. This class is designed for junior high students who want to go a little deeper into the many methods of propagating plants. As mentioned before, the younger classes learn to make simple tip cuttings; now the students learn to make leaf, stem, deciduous, and evergreen cuttings. They learn how some seeds need to be processed by cold storage (stratification) or have their seed coat roughened in some manner (scarification) before planting to ensure germination.

We study a little more in depth different soil mixes to be used for cuttings, seeds, and potted plants. We work with bulbs learning which to use at what time of year, growing some in containers and some in our gardens here. There are a number of house plants we propagate in the fall and put together in an indoor planter. We do a number of interesting projects which I vary from time to time, and we may put together a sphagnum hanging basket with maybe an asparagus fern we started from seed, or a coleus or juniper started from cuttings. We have also made totem pole planters with pothos or syngonium.

At the present time we do not have a program for high school students. I feel a program for these students would be well received and would help keep them actively interested until they are of age to attend the adult classes. I hope we will be able to put such a program together within the next year.

The four classes I have just discussed are the classes offered during the fall and spring at the Arboretum. The summer session meets twice a week for three weeks, and most planting projects are kept at a minimum due to the time factor.

The classes we are able to offer during the summer depend to a certain degree on the instructors. We try to obtain one

(continued on page 102)

An Arboretum is for people . . .

Wherever they live — home, apartment, condominium — most residents of Southern California like some kind of outdoor living as part of their daily life. The Demonstration Home Gardens at the Los Angeles State and County Arboretum are designed to show the possibilities in terms of plants, decking, furniture, ponds, fountains, lighting, shade, fencing, and walks. These elements are arranged in various patio settings which can be copied or altered according to individual taste and situation.

And, of course, the horticultural know-how for growing plants in hanging baskets and other containers is available from Arboretum experts.

SCE

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BOOKSHELF

New acquisitions to LASCA Plant Science Library:

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PROCEEDINGS OF THE 18th INTERNATIONAL HORTICULTURAL CONGRESS, 1970. Tel-Aviv. 1972, 5 vol.

(continued from page 100)

or two extra people to teach classes during this period so we may offer a wider range of classes and can accommodate as many of the applicants as possible. For the past two summers we have offered classes such as Plant Adventures, Experimenting with Plants, Bird Study, Art in Nature, and Life in the Lagoon. In the six meetings we have we manage to put together some nice projects, having fun and learning at the same time.

I feel "having fun" is one of the main reasons I enjoy teaching the classes at the Arboretum. While the children are basically here to learn, they should also have a good time; we know that as long as they are enjoying themselves they are very receptive to learning.

Teaching these classes can be easy if there are enough projects to keep them entertained. Otherwise, teaching these classes can be very difficult if you want the students to gain some knowledge. I personally feel a great sense of accomplishment when I can see that my students have picked up some basic information or have acquired a greater sense of the plant life around them.

Karen Asher is an Arboretum education assistant who has worked in the youth education section for the past two years.

COMBRETUM FRUTICOSUM (COVER)

This is a handsome, scrambling evergreen shrub that is most usefully trained as a vine. It is native to the tropics and is a recent Arboretum introduction. It will grow in most soils including heavy clay if ample drainage is provided. Exposure can be either full sun or partial shade although flowering is encouraged by full sun.

The flower begins as a lime color that deepens to a most attractive shade of orange and is extremely showy, resembling a profusion of large orange caterpillars.

Plants at the Arboretum have withstood severe frost with only moderate damage. They can be seen growing in the sunken garden near the entrance to the Demonstration Home Garden.

Botanically, the plant is described as a scrambling shrub with leaves ovate to elliptic, entire, petioled, opposite or whorled, dark green and glossy above and lighter green beneath. Inflorescences are golden yellow, becoming orange to reddish orange, showy and extending beyond the foliage.

When the plant blooms in August, it is one of the most spectacular plants in the garden and never fails to attract visitors' attention. We expect it to be a popular addition to the California landscape.

ARBORETUM WEATHER

Long. 34d 08' 48" N.
Lat. 118d 02' 59" W.
Elev. 571.28 ft.

Weather season:
Oct. 1 to Sept. 30

	June	July	August
Average daily maximum temperature	92.4	94.3	89.1
Average daily minimum temperature	56.6	59.6	60.5
Highest temperature	107	105	97
Lowest temperature	50	52	53
Number of clear days	19	20	8
Number of partly cloudy days	11	10	20
Number of cloudy days	0	1	0
Rain during this month	.02	.07	0
Total rain since Oct. 1st.	17.49	17.56	17.56

Calendar

October. November, December

ARBORETUM, Arcadia

October 5, 6 — 8 to 5 p.m.
Bonsai Show*
Presented by the Akebono Bonsai Society

October 13 — 10 a.m.
[illegible]

October 25 — 8 [illegible]

October 27 — 2 [illegible]

November 3 — 8 a.m.
[illegible]

November 17 — 10 a.m.
[illegible]

November 17 — 8 a.m.
[illegible]

November 24 — 8 a.m.
[illegible]

DESCANSO GARDENS, La Cañada

October 25 — 7 to 9 p.m.
Chrysanthemum Tea* (members only)

October 26, 27 — 9 to 4:30 p.m.
Chrysanthemum Show*
Presented by Glendale Chrysanthemum Society

December 6 — 1 to [illegible]
Red Carpet Preview (
Christmas Decorations

December 13 — [illegible]

[illegible]

ARBORETUM

[illegible]

DESCANSO

[illegible]

December
1974
Vol. XXIV
No. 4

Lasca Leaves

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department notes

VIRGINIA ROBINSON GARDENS

A RECEPTION and dinner to honor Mrs. Harry W. Robinson in recognition of her generous gift of her six-acre Beverly Hills garden estate to the people of Los Angeles County, was held last September 10 in the Arboretum's Demonstration Home Gardens.

On a beautiful, warm evening, some 150 guests attended the outdoor event, chatting with Mrs. Robinson and other notables who had played a role in the sometimes complicated transfer of the garden estate, to be known as the "Virginia Robinson Gardens," to the County. Among those involved were Mrs. Mary Richmond Bittner, president of the Board of Governors; Mrs. Rodney Rood, president of the Descanso Gardens Guild; Mrs. John A. Grivich, president of the California Arboretum Foundation Board of Trustees, hosts of the event; and Francis Ching, department director. Representing the Board of Supervisors was Supervisor Peter Schabarum accompanied by Mrs. Schabarum; and William Martin, representing Supervisor Ernest Debs in whose district the property lies. A key figure in handling the legal aspects was Mrs. Robinson's attorney, Odell McConnell. It was he who arranged for a million-dollar endowment to be part of the gift, which led to the acceptance of the gardens by the Board of Supervisors.

The evening ended with a toast to Mrs. Robinson by Bill Martin and everyone singing Happy Birthday to this remarkable lady who would celebrate her 98th birthday later in the month.

ISLAND PLANTING

THE latest segment of the new Arboretum entranceway to be completed is the triangular island just east of the Information Center. Combining function with beauty, it provides a head-in parking section on one side and a walk that provides easy pedestrian access and egress to the eastern section of the parking complex. The area has been replanted; the sunnier area to the west with two hybrids of *Gazania rigens,* 'Sun Gold' and 'Sun Burst', introduced by the Arboretum about a year ago, and the eastern, shadier area with potentilla. Six benches have been strategically placed in this section to provide visitors with a convenient loading, unloading, and waiting zone.

LOS ANGELES BEAUTIFUL

DURING this past year, Los Angeles Beautiful, an organization that exists for the sole purpose of making the city a more attractive place in which to live, has been celebrating its 25th anniversary. In honor of that anniversary, the Los Angeles State and County Arboretum has named one of its cultivars of *Chorisia speciosa* 'Los Angeles Beautiful'. The new cultivar is of exceptional beauty, having five-petaled, large, dark-red flowers that bloom in October and November. Unlike most species of the genus, its trunk is almost thornless.

As William Frederickson, Jr., observed following his installation as the organization's third president last March, the success of Los Angeles Beautiful is really due to the efforts of its first two presidents, Mrs. Valley M. Knudsen, now president emeritus, and Mrs. Virginia M. Baldwin. For in the early days, when it was often doubtful whether such an organization would receive enough community support to survive, it was their ef-

On behalf of Los Angeles County and Board of Supervisors, Supervisor Pete Schabarum presents plaque to Mrs. Harry W. Robinson in appreciation of her gift of her garden estate, arranged through her attorney, Mr. Odell McConnell, on left.

Another plaque for Mrs. Robinson, this one from the California Arboretum Foundation presented by Mrs. John A. Grivich, Foundation president.

forts that kept it alive and growing. Essentially, the methods they used were to initiate interest in various environmental and beautification projects among all segments of the community, and then follow through with organizational assistance, implementation, and, finally, with rewards. Under this past year's theme, "Color Your Community Beautiful," the organization sponsored eight projects that culminated in an awards program held at the Arboretum. Trophies were awarded for such projects as Outstanding Youth In Education Achievement, Outstanding Community Effort, Consistent Quality In Use Of Plant Materials, and the like. Last month, to bring attention to the Arboretum's release of 'Los Angeles Beautiful' to Monrovia Nursery for public sale, the organization made a formal presentation of the tree to the City of Los Angeles, thereby capping its beautification efforts for 1974.

To say something about the tree itself, a few chorisias were seen on the Los Angeles landscape as long as forty years ago. But interest was limited until 1953 when Dr. Samuel Ayres, Jr., a vice president of L.A. Beautiful, shared with the Arboretum seed he had collected in Brazil. *C. speciosa* proved to be the most adaptable to the climate of Los Angeles, and the Arboretum began to reintroduce the tree to Southern California, giving a large number to the Department of Parks and Recreation in 1959 for planting throughout the area. The trees, including those at the Arboretum, varied considerably in flower color and time of bloom. As a consequence, the Arboretum began to look for specimens more reliable in these respects. Ultimately, two outstanding clones were selected, 'Los Angeles Beautiful' and another named 'September Splendor', which blooms from early September through October. In addition to its upcoming availability from nurseries, scion wood of 'Los Angeles Beautiful' can be obtained from the Arboretum. 'September Splendor' will be introduced to the nursery trade next year.

EDUCATION

EDUCATION chief Tak Niiya gave us the following notes on upcoming activities within his divsion. "Schedules for spring adult and youth education classes will be available in January. Seventeen classes for adults will be given at our three gardens. Youth education schedules and registration forms will be available through the Youth Education Section by mail only. The 1975 brochures describing the Department's Sunday Morning Walk and Sunday Afternoon Lecture series will also be available next month. Of special interest in this series is a two-part program on the historical section of the Arboretum comprising a slide lecture on one Sunday followed by a walking tour of the buildings the next.

"The Department has selected *Cassia leptophylla,* an Arboretum introduction, as its 1975 Arbor Day tree. A specimen of the tree in a 5-gallon can will be denoted to schools participating in the Department's 1975 Arbor Day Conservation Week program. Invitations to participate have been mailed to 60 Los Angeles County School districts. A thousand schools representing half a million students are expected to accept. Each school will then receive a tree for planting during its Arbor Day celebration. In addition to the tree, the schools will receive a teacher resource packet containing ideas for classroom projects dealing with environmental and conservation topics, the history of Arbor Day and its significance today, a visual projection of the structure of a tree, and botanical and horticultural information on *Cassia leptophylla.* Finally, we wish to express our thanks to the

Las Voluntarias Arbor Day Committee for taking on the arduous job of assembling these packets which will be distributed early in February."

Arbor Day preview! Youngsters look over specimens of Cassia leptophylla, 1975 Arbor Day tree to be given to schools participating in Department program. A thousand of the trees have been growing at the Arboretum for the past three years.

Photo by William Aplin.

New hanging basket and container plant section in Sunset Demonstration Home Gardens at Arboretum.

NEW DISPLAY

PERHAPS the greatest appeal of the Arboretum is the variety of its attractions, particularly those in the Sunset Magazine Demonstration Home Gardens that mix design with horticulture. The latest addition, on the left just as you enter the area, is a display of hanging baskets and container plants that will vary according to the season. The aim is to demonstrate to visitors the range of plant material that can be used most effectively, and how little space is necessary to turn a small area into an attractive garden highlight. Responsibility for maintenance of the display has been assumed by Las Voluntarias, Wendy Taylor in charge. When it opened last October, Mrs. Taylor had fuchsias, ivies, ferns, and multi-planted baskets of annuals to supply color, plus containers of coleus and chrysanthemums.

Photo by Frank Simerly

Rose display at meeting of Men's Garden Club of Los Angeles.

MEN'S GARDEN CLUB

It is not too often that the public has an opportunity to see in a single display a collection of long-stemmed new roses representing the best efforts of top professional growers. That they did have the opportunity is due the Men's Garden Club of Los Angeles which held a luncheon-meeting in the Arboretum's Demonstration Home Gardens last October 10. As can be seen in the accompanying photograph, the club's vice president and general manager, Lovell Swisher, assembled some outstanding specimens from three growers. The display was left for public inspection over the following weekend. Among the speakers at the meeting were William Warriner, representing Jackson and Perkins, Oregon growers, and Jack E. Christiansen, representing Armstrong Nurseries. Among the new roses were 'El Dorado', 'Futura', and 'Ann Factor'. 'Don Juan' was one of the climbers represented. The largest and most spectacular display, set off by branches of round-leafed eucalyptus, was 'City of Hope' from William Conklin.

PETUNIAS AND SMOG

The Research Division of the Department of Arboreta and Botanic Gardens has achieved a genetic first by breeding a smog-tolerant variety of petunia. On page 117 of this issue, project leader Dr. George Hanson and his associates report on how they arrived at their breakthrough. A few questions relative to that report come to mind which we think will interest our readers. One is, why petunias? Another is, how long has this Department's smog research been going on and what are its parameters? One very practical reason for attempting to isolate smog-tolerant petunias is that petunias are, or have been, the number one bedding plant in this area. Indeed, the petunia may well be the most common bedding plant throughout the world. But because petunias are so sensitive to smog and are so severely damaged, they are not being grown as extensively as in the past, thereby causing inroads into what has been a million-dollar-a-year business in Southern California. The achievement of Dr. Hanson and his associates in breeding a smog-tolerant petunia variety thus becomes highly significant in the face of this economic factor, for it can only lead to the reversal of an unfortunate trend. There are other practical reasons for selecting the petunia as a study-plant in relation to smog that are perhaps of even greater importance to the scientist, if not to the nursery industry or the home gardener. Accepting the fact that smog affects plants adversely, and the argument that it is desirable to find out why, the petunia, along with *Poa annua* (annual bluegrass) lends itself to this kind of study because it is small and therefore

easy to handle, unlike, say, dahlias, nettles, or tomatoes. Another reason is that petunia plants show symptoms clearly, unlike lettuce, for example. Smog damage to petunias shows by a banded appearance on the leaves. If a plant were put out every day for seven days, it would show seven bands. Further, the whitest band would indicate the day of highest smog.

Smog research in relation to plants has been going on at the Arboretum for 17 years, beginning with early studies by Juhren, Noble and Wright who, in conjunction with the Los Angeles County Air Pollution Control District, established *Poa annua* and *Petunia hybrida* 'Rosy Morn' as "indicator plants to monitor pollutant concentrations throughout the Los Angeles basin." The direction of the research changed as more sophisticated means of measurement became available and knowledge of the constituents of smog widened. Los Angeles smog is relatively unique because it consists of ozone and PAN (Peroxyacyl nitrate), whereas in most cities the main problem is sulphur dioxide. It is PAN, incidentally, that burns the eyes. There are several reasons why Los Angeles smog is photochemical in nature: it has a higher ratio of automobiles to industry than eastern cities; it has more sunlight, higher temperatures, and inversions caused by being situated in a basin.

Once the nature of Los Angeles smog was established (by Dr. Arie J. Haagen-Smit of Caltech), one avenue of research at the Arboretum was aimed at the analysis of the effect of smog on plants, mainly petunias. There are a number of methods used to measure smog damage. One is by simple observation of living plants, a method developed by researchers working at the Arboretum, and one that is still used. Other methods measure the concentration of air pollutants via chemical solution or by electronic means.

Finally, through the combination of theoretical and practical means, Dr. Hanson and his associates are advancing on an understanding of the generation transference of smog-tolerance capacity. The final goal is to answer the question: Why is one plant more tolerant than another? In the case of petunias, this has been partially answered. Other common plants will receive similar study.

CHRISTMAS DISPLAY

From December 7 to December 15 the Hospitality House at Descanso Gardens will again be the setting for the Descanso Guild's annual showing of Christmas displays and decorations for homes and gardens.

For the past several years the showing has brought pleasure and inspiration to the thousands of visitors and Southern Californians who have come to view it. The invitational exhibits are created by professional artists and decorators as well as by amateurs with exceptional ideas and flair. Some are done by children whose youthful interpretations of Christmas are often delightful.

There will be more than eight individual entries which include table settings, wall hangings, trees, crêches, paintings, wreaths, even kitchen decorations and miniature houses.

This year one feature will be a small room decorated as "Christmas in an artist's studio." It is being prepared by Alice Hendrickson and decorator Frank Ferris, both of Arcadia. All of the delightful paintings depict children at Christmas time. Another simulated room will be an English dining room decorated for Christmas dinner in the Della Robbia motif using garlands of fresh fruits, nuts and antique furniture. Jeanne Akers and

Miriam Costello of Stonehouse in Montrose are creating this.

Visitors may note the Christmas weaving done by William Cahil Johnson of Sherman Oaks; the leaded window designed by Leone McNeil of Los Angeles; a weathered wood sculpture which has been embellished as Christmas in Ireland by Esta Stough of Long Beach; the herb wreaths using herbs mentioned in the Bible, an entry by Jean Cozart of the San Fernando Valley Herb Society; a Christmas wreath clock designed by Marion Anderson of Glendale; a table arrangement entitled "Ice Storm" by Betty and Carol Kusak of Canoga Park; a wall piece entitled "Bird's Christmas Treat" created by Marianna Bowman of Pasadena, or an original wall hanging of the crêche scene which took 200 hours of applique work by Shirley Kussman of Los Angeles. This year the furnishings for the formal living room are being planned by Jean Simpson of Biggars of Pasadena. She is coordinating it with Christmas decorations by Mrs. Cecil Eshelman of Escondido and Ruth Kern of North Hollywood. Mrs. Eshelman traditionally has also provided arrangements of the exotic Protea flowers throughout the house which come from her husband's nurseries.

The terrace of Hospitality House will again be tented and will be the locale for refreshments and a boutique of garden-oriented items that will make charming gifts or mementos of this year's Christmas show. Many of these sale items have been made by Guild members working throughout the year. Proceeds of such sales go to further the work of the Guild as they aid Los Angeles County in enhancing the Gardens for the public's pleasure. Funds are also used to maintain a program of gardening experiences for the handicapped children of Los Angeles County.

Wall hanging of creche scene, the work of Ms. Shirley Ann Kussman, can be seen at Christmas display at Descanso Gardens.

The day before the house opens to the public for the "Nine Days of Christmas," there will be a preview invitational "Red Carpet Tea" for Guild members and their guests, and a Press Preview that evening which the Rose Queen and her Court will also attend.

For the fourth year, Christmas music will fill the house with special spirit as

advanced students of Adricenne Westerback, organists, entertain on an instrument furnished by Gould Music Co. of Glendale. There are thirty-three organists, some of whom will be playing for the fourth year, who volunteer their talent for this event. They play approximately an hour and a half each in rotation during the nine-day show. On Sunday afternoon, December 8, at 3 o'clock, the Symphonietta Strings from Burbank will play Bach's Christmas Chorale and other Christmas music.

Co-chairman of the show this year are Mrs. Rodney Rood and Mrs. John Urabec. Helping them are the following women: Mesdames Francis Usher, Russell W. Justice Jr., Roger Gurley, Exhibits; Claude Bartlett and Elmore Aronstam, Terrace Boutiques; David Anderson, Exhibitor Hospitality; E. Kent Springer, Sign In; James C. Arnett and Thomas H. Rea, Hospitality; Paul F. Decker, Guy Johnson and Kenneth Wilson, Hostesses; James Corcoran and Charles Wirch, Music; Arthur Downer, Plant Sales.

The Hospitality House will be open for the Christmas Show from 9:30 A.M. to 4:30 P.M. daily. Free tram service is available from the entrance gate. There is no admission charge to the show.

ROSE PARADE

The most famous of parades on New Year's Day will have an added interest this year for readers of *Lasca Leaves*. The Department of Arboreta and Botanic Gardens, through its director, Francis Ching, has received a distinctive honor by reason of his having been invited to serve as one of the five judges of the coming Tournament of Roses Parade. The one aspect of the floats that is unique and that has brought them worldwide attention is, of course, their decorations which, according to rule, must consist only of flowers and plant parts. Competion among the 60 floats allowed each year is intense and contributes to their high cost, ranging from $20 to $40 thousand, depending on size, amount of animation, and so on.

HUGO REID ROUNDUP

Being a member of the California Arboretum Foundation brings many privileges and extras not available elsewhere. Among them is the Hugo Reid Roundup, a members-only event. Held last August 23 in and around the Hugo Reid Adobe, some 200 members and 70 children enjoyed an evening of family fun. Under the chairmanship of Tootie Grivich, Foundation president, a well-organized evening started at 6 o'clock and ended three hours later. Adults enjoyed an authentic Mexican dinner served by vice president Ruth Mary Larson and her committee, and prepared by Francis and Elaine Ching with John Provine and Calvin Allen assisting. The youngsters roasted hot dogs for themselves under the supervision of Mary Atkinson.

Patricia Warren, historical curator of the Arboretum, opened the Hugo Reid Adobe for the occasion and decorated it with fresh flowers. There was fishing with bamboo poles in Lasca Lagoon, and a magic show presented by 11-year-old Tommy Peters, a neighbor of Mitzie Moore, president of Las Voluntarias. Carol Brayshaw arranged some games for the children climaxed by three pinatas—the traditional Mexican star, a bull, and a peacock, all containing candy which tumbled out as the youngsters enthusiastically hit them with sticks. Throughout the evening, Mexican music was provided by the band of Richard Castruta.

SMOG-TOLERANT PETUNIAS DEVELOPED AT THE LOS ANGELES STATE AND COUNTY ARBORETUM

George P. Hanson, Daniel H. Addis, and Linda Thorne

A recent product of our ongoing air-pollution research program is a petunia variety which has exhibited considerable tolerance to ambient smog. Selected from crosses among pink, multiflora, and inbred lines obtained from commercial petunia breeders, the variety we are calling LASCA PINK showed greatest smog tolerance when tested against a number of widely grown petunia hybrids. LASCA PINK hhas undergone inbreeding to select for, and fix, the genes responsible for photo-chemical-oxidant-type of air pollution tolerance.

Since it may lack some of the vigor and other desirable characteristics possessed by commercial F_1 hybrids, the immediate beneficiary of LASCA PINK will probably be the commercial petunia breeders. They can use this variety as a source of germplasm to increase the air pollution tolerance in hybrids they sell to the public. It is hoped that within a year or two, progeny of the variety will be seen throughout Los Angeles County and the world. Although LASCA PINK bears pink flowers, we anticipate no problems in the transfer of its smog-tolerance genes to petunia plants of other colors or even to the grandiflora petunia type.

A plant breeder needs to understand the inheritance of a trait before he can efficiently introduce into existing stocks those genes which affect the trait. We have found that genes influencing photochemical air pollution tolerance in petunias are mostly additive in their action. This means that two inbreds differing in air pollution tolerance will, when crossed, yield offspring intermediate in tolerance. Although lesser in importance, the genes for smog tolerance do show some evidence of partial dominance. Geneticists would say that the genes are completely dominant if a tolerant plant yielded all tolerant offspring when crossed with a sensitive plant. If the genes for smog tolerance are partially dominant, the smog response of the progeny would approach but not equal that of the tolerant parent. Since most of the inheritance of smog tolerance genes in petunia is additive, and the remainder shows partial dominance, this means that the progeny would be intermediate between the two parents and have a greater likelihood of being more tolerant than expected solely on the basis of an additive-type of gene action.

A brief history of the origin of LASCA PINK will be of value to anyone who plans to grow it. A few years ago we obtained from John Mondry (then petunia breeder at Bodger Seeds, Ltd.) the two most smog tolerant F_1 hybrids he had tested. One of these was Pink Satin, a

Two petunia plants differing in genetic tolerance to smog were exposed to the same pollution dosage. The sensitive plant on the left developed whitish, necrotic spots; the tolerant plant on the right shows no symptoms.

Bodger production, and the other was Sundance, a production of Joseph Harris Company, Inc. At the same time, we obtained two other hybrids, Coral Satin (Bodger) and Gypsy (Harris), which were known to be very smog sensitive. During the course of our air pollution studies, we acquired the inbred parents of each of these hybrids and crossed each inbred with every other inbred in all possible combinations. In 1972, we fumigated a large number of resulting seedlings with ozone (one component of ambient photochemical air pollution) and selected 30 of the most tolerant individuals. Pollen was collected from each plant, mixed, and used to pollinate stigmas from these same plants. Fertilization occurred and the resulting seeds were collected and bulked.

During the spring of 1973, a second cycle of selection was conducted. The first selection generation seeds were planted and about 400 seedlings were subjected to ambient smog during their development. Whenever a plant showed any smog-injury symptoms, it was destroyed. Finally, only about 30 uninjured or slight-

ly injured plants remained. Pollen was collected from each plant, mixed, and applied onto the stigmas of these smog-tolerant individuals. Fertilization occurred and the resulting seed was collected and bulked. We called this seed LASCA PINK-2.

During the spring and summer of 1974, the above procedure was repeated to yield a third cycle of selection—LASCA PINK-3.

In order to obtain some measure of the progress we were making in our selection program, we decided to compare LASCA PINK-2 smog sensitivity with that of some varieties being grown commercially. Allen Wilson, of Goldsmith Seeds, Inc., provided us with seed of several of their petunia hybrids. These seeds and some others we acquired were planted during the spring of 1974. Within the next four months the seedlings were scored five times for smog tolerance. Each time a rating scale from one to five was employed where 1 = no visible injury and 5 = the maximum injury suffered by any individual at that time. Seedlings were scored from the time they had 4 to 6 leaves until they had bloomed over a period of weeks and had developed seed. The plants were maintained in a greenhouse throughout the experiment and with a few exceptions did not deviate significantly in relative smog injury from one scoring period to the next. Table 1 presents the average of the 5 scoring periods for each variety.

Our LASCA PINK-2 was much more smog tolerant than any other variety in the test. Of the varieties tested, it appears that white- and red-flowered petunias were more smog sensitive than pink, blue, and violet colored plants. This is probably due to the ancestry of the various flower colors of petunias rather than to any linkage of flower color with smog tolerance.

One hundred seeds of LASCA PINK will be provided free of charge to any qualified petunia breeding organization. Requests from individuals will be honored with 25 seeds as long as our supply lasts.

Figure 1. Relative smog scores of 19 petunia varieties tested under greenhouse conditions at Arcadia, California during the summer months of 1974.

Variety	Flower Color	Smog Score*
LASCA PINK	pink	1.1
Happiness	rose pink	1.5
Blue Cloud	violet	1.7
Rose Joy	rose pink	1.9
Blue Skies	light blue	2.0
Fire Chief	red	2.0
Pink Joy	salmon pink	2.0
Purple Joy	violet	2.2
Red Joy Imp.	red	2.2
Star Joy	rose pink and white	2.3
Mariner	violet	2.4
Viva	red and white	2.8
Coral Satin	dark salmon pink	2.9
Comanche	red	3.1
Apollo	white	3.2
Burgundy	wine red	3.4
Candy Apple	red	3.4
Glacier	white	3.7
White Joy	white	4.4

* A value of 1.0 indicates no injury, a value of 5.0 indicates that plants showed most injury of any in test.

Daniel Addis and Linda Thorne were research assistants to Dr. Hanson on this petunia project which was supported in part by Grant No. R-801428 from the United States Environmental Protection Agency, Washington, D.C.

PLANT PORTRAITS

SEQUOIADENDRON — *"The Biggest Living Thing on Earth"*

Leonid Enari

ONE of the sequoidendrons in Sequoia National Park has dimensions which have earned it the title, "The Biggest Living Thing on Earth." The tree is the General Sherman. Its age is believed to be between 3,000 and 4,000 years and there is no sign of senility.

Dimensions of the General Sherman

Height	272.4 ft.
Circumference at base	101.6 ft.
Diameter at base	36.3 ft.
Diameter at 60 ft. above ground	17.5 ft.
Diameter at 120 ft. above ground	17 ft.
Diameter at 180 ft. above ground	14 ft.
Height to first larger branch	129 ft.
Diameter of largest branch	6.8 ft.
Volume of trunk	50,010 cu. ft.
Weight of trunk	625 tons
Weight of tree	1,000 tons (est.)

There are trees of other species that are taller and older than the General Sherman, but there is nothing as mighty as this tree.

Sequoiadendrons, also known as giant sequoias, big trees, or the Sierra redwoods, grow in more or less isolated groves on the western slopes of the Sierra Nevada in Central California. Most of these groves are at elevations between

The General Sherman

4,400 and 7,500 ft., although some occur as low as 3,000 ft. and a few as high as 8,900 ft. The best stands grow in protected locations where the average annual precipitation is from 45 to 60 inches and where the precipitation occurs in the form of snow during September to May. The temperature occasionally drops to -12 F and seldom exceeds 100F. Sequoiadendrons do not form pure stands, except in small groves, but are associated with other trees among which sugar pines, ponderosa pines, white firs, incense cedars, and California black oaks are most common.

The first sequoiadendron stands are believed to have been discovered by members of the Joseph Walker exploration party which came upon the Merced and Tolumne groves in 1833. The groves now belong to the Yosemite National Park. The largest sequoiadendron forest, however, remained unknown until 1858 when Hale Tharp, a settler, was guided by the Indians to the grove which in 1875 was named by John Muir, "The Giant Forest," and which in 1890 became the Sequoia National Park. It was here that Tharp built a summer cabin in a fire-hollowed sequoiadendron log which he ocupied for many seasons and where he entertained John Muir in 1879. Tharp's log today is a popular attraction for park visitors.

The age limit of sequoiadendrons is unknown because there is no record of one dying of old age. It is certain that they live 4,000 years, reasonably certain that they can live 5,000 or 6,000 years, and probable that they may live even 7,000 or 8,000 years if protected in national parks. There is a record of a felled sequoiadendron that had 3,126 annual rings, and John Muir reported one tree stump in Converse Basin that was 4,000 years old. The age of the biggest standing sequoiadendrons, however, can only be estimated because the coring instru-

A sequoiadendron at the Arboretum.

ments used to determine the age of lesser trees will not penetrate to the heart of these giants.

Sequoias never die on their feet, they fall. The tremendous weight of the mature tree makes it sensitive to any change in the stability of the ground on which it stands. It has no tap root. Its massive but shallow roots are brittle and without great strength. It is kept erect by the balance resulting from equal distribution of weight upon the base. If ground conditions change, for example, by stream erosion cutting away the soil from one side of a tree, or the soil being softened by changes in underground drainage—the balance of the tree is threatened. Once a tree loses its balance it cannot be restored. Loss of balance is usually followed by an increasing degree of tilting until finally the tree, its roots unable to hold, crashes to earth. It usually happens when the ground is wet from melting snow. Occasional winds may provide the final push. The falling of the tree opens up the ground so that the seedlings can establish themselves, and a new generation comes into being.

Sequoiadendrons produce cones and seed, after reaching maturity, in great numbers. It is estimated that a mature tree produces about 2,000 cones per year, each single cone containing 100 to 300 seeds.

The seeds are very light, about 91,000 per pound on average, and may be carried for great distances by air currents. The greatest distance that wind will carry the seeds is not known although a case has been reported of seed being carried 580 feet.

The seedlings usually become established only on disturbed soil or on ashes in burnt-over area. Only very few seedlings are found in groves where the litter is high and dry. Although records are not available, probably only one seed in a million germinates under natural conditions and only a small percentage of these survive.

Sequoiadendrons have no dangerous enemies, except fire. A single fire can destroy seedlings and saplings but not mature trees protected by 1- to 3-foot thick fire-resistant bark. Many fires are needed to seriously damage these trees. It is believed that practically every old tree has been subject to fire not less than once every twenty-five years prior to protection by national park status. Thus, a tree three thousand years old may have withstood a hundred or more fires. However, some trees have been killed by repeated fires, as evidenced by the black monuments presiding over their descendants in several groves.

Botanically, this species was included in the genus *Sequoia* until 1939 when John T. Buchholz, an American botanist, suggested that it belongs to a different genus he named *Sequoiadendron*. He then transferred it to the new genus as *Sequoiadendron giganteum*. (Lindl.) Buchh.

Sequoiadendrons can be seen at the Los Angeles State and County Arboretum in quadrat 0 8 (south of the Coach Barn, close to the road) where two specimens grow side by side. They originate from seed Dr. Russell Seibert, former director of the Arboretum, collected in the Yosemite National Park in 1951. The trees were planted in their present location in February 1954, and are now more than 23 years old. Their almost perfect pyramidal slope suggests they would make a perfect outdoor Christmas tree.

Standing in the front of these trees one may wonder how long they will last here. Will they live 3,500 years as has the General Sherman? Will they become as mighty? Will they grow as tall? Only time will tell. Sequoiadendrons can also be found at Descanso Gardens in La Canada and at South Coast Botanical Garden in Rolling Hills.

HYDROPONICS

Principles and Guidelines

Wade L. Berry

Hydroponic Culture

HYDROPONICS is the science and art of growing plants in water without the use of soil. The science is in knowing what essential nutrients to add to the water. The art is in knowing when and how much to add for healthy plant growth. A more general term for this method of growing plants is nutri-culture, a term applied to all methods of growing plants in some media other than natural soil. Of principal interest in this paper are hydroponics (often called either water nutrient or solution culture), sand culture and aggregate culture. Basically, these methods are the same. They all provide the essential nutrients in the form of a dilute salt solution and differ only in the way in which the plants are supported in an upright position. In pure hydroponics, the tops of the plants are supported, and the roots are allowed to hang free into a nutrient solution. In both sand and aggregate culture the plants grow normally and are supported by their roots which are anchored in some inert material, such as sand or gravel, and which are regularly irrigated with nutrient solution. Sand culture consists of growing the plants in inert sand —usually quartz sand washed free of all contaminates—and watered frequently with nutrient solution. In aggregate culture, coarser materials, such as gravel, cinders, or crushed granite, are used in place of sand.

The nutrient solution used to irrigate plants supported by inert media such as sand and gravel must have the same nutritional value as that used for pure hydroponics (Hewitt 1966).

These three hydroponic systems can also differ by being either a "closed" or "open" system in respect to the nutrient solution. In a closed system the same nutrient solution is maintained in the plant beds, or is periodically recirculated through the plant beds to supply water and nutrients to the plants. In open systems fresh nutrient solution is applied to the plant beds each time they are irrigated, and the nutrient solution not used by the plant is discarded and allowed to drain away. The open system is much less susceptible to plant toxicity problems than the closed system but does pose some problems in disposal of the excess without polluting the environment.

The science of hydroponics is neither new nor simple. It is an alternative method of supplying mineral nutrients and water to growing plants. It has been used for scientific purposes since the middle of the nineteenth century. Much of our knowledge about the micronutrients essential for life come from experiments using this technique. It should be pointed out that there is no magic in hydroponics. Plants grown in soil, soil mixes, or water, can produce equal yields of equal quality provided that each media is managed appropriately. The taste of tomatoes grown in water will vary to some degree, just as the taste of tomatoes grown in soil will vary from one section of the country to another. The important thing is that the correct root environment must

be maintained in each media and growing system to insure good plant growth.

The necessary environmental conditions which the root must be provided are water, oxygen and the essential mineral nutrients, plus support under natural conditions. Fortunately, many of the common horticultural and agronomic plants are very similar in their nutritional requirements. This allows us to concentrate primarily on the general techniques of hydroponics rather than compiling a list of anomalies associated with the particular requirements of individual plants.

Advantages and Disadvantages

The principal advantage of growing plans hydroponically is the precise control the method offers over the growing conditions. For example, such matters as the kind and amount of essential nutrients can be controlled in a water medium to a degree not possible in soil. This control makes possible the maximization of such qualities as plant size, leaf color, fruit yield, or oil production. Further, any or all of these qualities, determined by the set of conditions chosen, can be repeatedly and uniformly reproduced. Control over growing conditions and, by extension, reproduction, can be a very desirable advantage any time that the timing and yield of a particular high-value product needs to be known in advance. In a different context, it should be mentioned here that by reason of this high degree of control, hydroponics is a very valuable and versatile research tool.

The disadvantages of growing plants hydroponically are the large amount of equipment and care required and the need to know more about the physiology of the plant in order to provide the right growing conditions. The amount of care can be reduced somewhat by the use of additional automatic equipment.

When plants are grown hydroponically there are many more parts of the root environment that are possible to control and need to be controlled than are either possible or feasible when plants are grown in soil. Although such things as temperature, nutrient replacement, and oxygen must be considered, it is the mineral nutrition that is most amiable to manipulation and most likely to be mismanaged. Deficiencies of one or more essential mineral nutrients, or toxicity of a wide variety of substances including the essential nutrients, can and does occur. Hydroponics primarily differs from other plant growing systems in the way in which the nutrients are supplied. Therefore, the differences required in the cultural management of hydroponically grown plants are in relation to their nutrition. All other cultural practices such as light, temperature, season, and so on are managed in the same way as for soil-grown plants. The amount of nutrients required by a plant is a function of the plant's growth rate. If the growth of the plant is slow due to low temperature, low light or other conditions, then only a limited amount of nutrients is required. If these conditions are improved and the growth rate of the plant is increased correspondingly, then both the amount and frequency of the nutrient additions will have to be increased.

Nutrient Requirements

Plant nutritionalists generally accept 16 elements as being essential for the normal growth and development of higher plants ,Steward 1963). Three of these elements are normally obtained from air and water (carbon, hydrogen and oxygen). The other 13 elements are generally obtained directly from the soil by way of the plant roots. These elements are called the mineral nutrients and are divided into the macronutrients and micronutrients depending on the amount of each nutrient

required by the plant (see Table 1). The macronutrients are present in dry plant material in the percent range, while the micronutrients are present at the level of only a few parts per million.

Although in theory the growing of plants in water is relatively simple, some experience in both the fields of chemistry and botany is desirable. Further, the equipment required for growing plants hydroponically is not the same as that normally associated with backyard gardening. However, the pleasure derived from hand-feeding the plant the required essential elements and from learning to recognize the deficiency symptoms can be very rewarding for the extra effort and study involved.

Many factors, such as concentration, pH, total amount of nutrient present, plant growth, plant requirements and their interactions, are all interdependent and have to be considered simultaneously. Solution culture does offer the grower the greatest control over the growth of the plant. But, at the same time, it implies that the grower will have to monitor and control more variables to obtain normal plant growth than would be necessary if the plants were grown in soil.

In hydroponic culture the required mineral nutrients are supplied as a dilute solution of their salts, and oxygen availability is maintained by constant aeration of the nutrient solution or by repeated flooding and draining in aggregate culture. The preparation of the hydroponic solution is relatively simple and easy if the water and salts are pure. However, if pure water and salts are not available, the actual composition of these materials will have to be considered and in some cases adjustments made. The preparation of nutrient solutions should be done under conditions of extreme cleanliness. When plants are grown in hydroponic culture, in contrast to soil, there is relatively little buffering capacity or resistance to change in the system and very small amounts of biotoxic materials will result in plant growth reduction. The hydroponic solution given in Table 2 was developed for tomatoes, but has been found adequate to satisfy the nutrient requirements of many types of plants. Silght modifications of this solution may prove better depending upon the plant species being grown and the type of growth desired. That is, whether top growth, root growth, fruit or some other aspect of growth or yield is being encouraged. For example, if corn and certain other grass-type plants are grown in this nutrient solution, the amount of added iron should be increased 2 to 4 times. Researchers in plant nutrition will recognize the formula presented in Table 2 as a minor modification of half - strength Hoaglands solution (Hoagland and Arnon 1950). Concentrated stock solutions are prepared so that routine nutrient additions can be done by simple dilutions without the need to weigh and dissolve numerous salts each time. The stock solutions can be stored successfully, preferably in a cool and dark place. It will be necessary to prepare the two concentrates (#1 and #2) in separate containers in order to avoid a precipitate of calcium phosphate. Fiberglas or plastic-lined containers are recommended. These containers should be opaque to light because these solutions are excellent for the growth of green algae in the presence of light. Once the nutrient solution is prepared, most of the tedious work is done and it is then possible to concentrate on growing the plants.

Nutrient Preparation

The chemicals needed to prepare the stock concentrations are generally available from agricultural fertilizer companies. In some areas, nurseries sell pre-

mixed salts to prepare the nutrient solution, which vastly simplifies nutrient preparation. Molybodic acid is somewhat less available than the other chemicals but its omission in many instances will not be deleterious because impurities in the other salts will supply the very small amount required. The exact amount of each salt should be weighed out on a scale that reads at least in fractions of an ounce.

Recipe For Preparation Of Nutrient Solution:

Supplies needed:

1. A scale that reads in fractions of an ounce.
2. Three (5 gallon) containers
3. Salts listed in Table 2.

Stock concentrate #1

This contains the majority of macronutrients and all the micronutrients needed.

1. Weigh out the appropriate amounts of the macronutrients, salts, potassium nitrate, potassium phosphate, magnesium sulfate and sodium chloride. Place these in a 5-gallon container, add 4 gallons of water and mix until all salts are completely dissolved.

2. Weigh out the appropriate amounts of the micronutrients, boric acid, manganese sulfate, zinc sulfate, copper sulfate and molybdic acid. Place these in a separate 5-gallon container and mix with warm water 60°C (140°F) to volume. Without the warm water the boric acid may not dissolve easily.

4. Add one-half gallon of the dissolved micronutrient solution to concentrate I and make to volume.

Stock concentrate #2

1. Weigh out the appropriate amount of calcium nitrate and place in a 5-gallon container.

2. Add 4 gallons of water and mix until dissolved.

3. Weigh out the appropriate amount of iron chelate (sequestrene 330 Fe) in a small container. Mix to a slurry with a small amount of water.

4. Add the iron chelate slurry to the calcium nitrate solution and make to volume.

Working nutrient solution

From the two (1 and 2) stock solutions it is necessary to make a 1 to 200 dilution.

1. Add 3.2 fluid oz. of each stock concentrate and make to 5 gallons.

or, 1 qt. of each concentrate to 50 gallons,

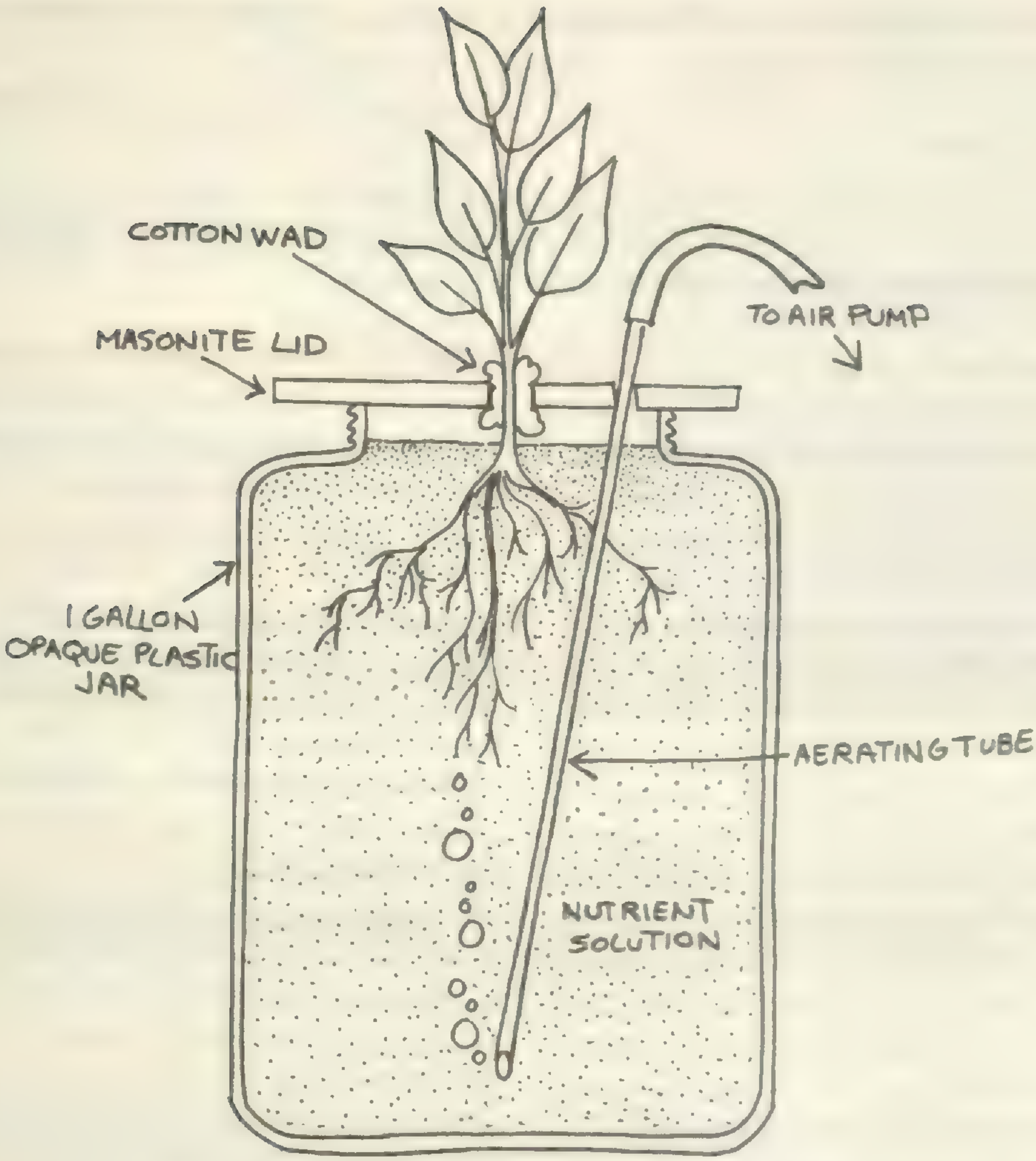
or, 50 ml of each concentrate to 10 liters.

This is the dilute salt solution used to feed plants.

The concentrates can be diluted to make the nutrient solutions either manually or by the use of equipment such as aspirators or proportioners. Aspirators and proportioners introduce small amounts of concentrate into waterline, as a function of flow. Whenever these are used it is wise to make sure that the concentrate is fully mixed with water before it is applied to the plants. A simple check is to add food coloring to the concentrate, then mixing can be checked visually.

Equipment

A number of different containers for plant growth may be used with success in solution culture work. The size of the container is governed by the same criteria that determines container size when using soil mixes. That is, the smaller container the more often it will have to be cared for, and the larger the container the fewer plants that can be placed in a given area. Many times greenhouse space is



SOLUTION CULTURE SET-UP

Fig. 1

more important than the amount of care required. Containers of glass, plastic or fiberglass having a capacity of one quart or greater will work well. However, if plants the size of tomatoes are to be grown to maturity and a crop harvested, no container smaller than 5 gallons should be considered. The containers should be opaque, or painted with an opaque paint, to prevent the growth of photosynthetic microorganisms (algae). The lids of the container should also be opaque to light. It has been found to be convenient to construct the lids from sheet plastic or masonite. The lids are cut to size and two holes drilled. One, one-quarter inch hole for the aeration tube is drilled close to the edge and a one and one-half inch hole in the center for the plant (see Fig. 1). Vigorous uniform aeration is necessary to oxygenate, stir and maintain a uniform solution composition and temperature. Without aeration the roots of many plants will drown and die. The aeration can conveniently be done by placing a glass or plastic ¼-inch tube connected to a compressed air supply in the bottom of the container. The compressed and filtered air supply should be adjusted so that a rapid stream of individual bubbles is coming out the end of the tube. For a single container,

the air pumps which are used for aquariums will supply sufficient air.

Seedling Growth

Germination of seeds for liquid culture solutions is not generally done directly in the culture solution because of mechanical problems in holding the seed. Also, when the seeds are germinated elsewhere, uniform seedlings can be selected for transplanting. For most purposes, the seeds can be germinated in trays of No. 2 horticultural vermiculite. The trays should be deep enough so that the roots will not reach the bottom before being transplanted to the culture solution. Water the germinating seeds with the nutrient solution described in Table 2, but dilute it to one-fifth strength to avoid salt injury to the young plants. Most plants are ready to transplant to the culture solution when the first true leaves have emerged. It is not critical that they be planted at this time, but excessively large plants will suffer greater transplant shock.

The seedlings are removed from the vermiculite for transplanting by carefully submerging the tray with the seedlings in water and gently floating the seedlings from the vermiculite. Some of the smaller particles of vermiculite may adhere to the root; do not remove these, for doing so might injure the root, and a few particles will cause no harm. Carefully wrap a small wad of Dacron, nonabsorbent cotton, or plastic foam around the stem of the seedling and place it in the hole in the center of the lid of the nutrient solution container. The dacron gives support without bruising the young seedlings. At this time it is extremely important to make sure that the nutrient solution covers the entire root of the seedling. Care should be taken at this time to make sure that the root does in fact hang down into the nutrient solution for often it will adhere to the lid.

Table 1. Essential Mineral Nutrients for Plants

Macronutrients	Micronutrients
Potassium	Iron
Calcium	Chlorine
Magnesium	Boron
Nitrogen	Manganese
Phosphorus	Zinc
Sulfur	Copper
	Molybdenum

Table 2. Preparation of stock concentrations for 200:1 dilution

Stock concentrate #1

	Amt./L	Amt./5 gal.
Potassium Nitrate (KNO_3)	50.5 g	33.8 oz.
Potassium Phosphate (KH_2PO_4)	27.2 g	18.2 oz.
Mgns'm Sulfate ($MgSO_4 \cdot 7H_2O$)	49.3 g	32.9 oz.
Sodium Chloride (NaCl)	5.8 g	3.9 oz
Micronutrient concentrate	100 ml	64fl. oz.

Fill with water and mix thoroughly to dissolve all salts.

Micronutrient concentrate

	G/L	oz./5 gal.
Boric Acid (H_3BO_3 85%)	2.85	1.90
Manganese Sulfate ($MnSO_4 \cdot H_2O$)	1.54	1.03
Zinc Sulfate ($ZnSO_4 \cdot 7H_2O$)	0.22	0.15
Copper Sulfate ($CuSO_4 \cdot 5H_2O$)	0.08	0.05
Molybdic Acid ($MoO_3 \cdot 2H_2O$ 85%)	0.02	0.01

Fill with water and mix thoroughly to dissolve all salts.

Stock concentrate #2

	G/L	oz./5 gal.
*Calcium Nitrate $Ca(NO_3)_2 \cdot 4H_2O$	118.1	78.8
Sequestrene 300 Fe	5.0	3.3

Mix the iron chelate thoroughly in a small amount of water before adding to the calcium nitrate concentrate.

*If commercial agricultural calcium nitrate (Norsk Hydro) is used, add only 88.8 g/L=59.3 oz./5 gal.

Dr. Berry is a soil scientist on the Department research staff with a special interest in the efficiency of nutrient utilization by plants. He is the author of a number of technical publications on the subject.

Tall Trees and Test Tubes

Wayne Loescher

A RESEARCH program recently begun at the Arboretum involves growth of plants under unusual conditions (Figures 1 through 5 illustrate some of these conditions). Small pieces of tissue are removed from intact plants and placed in sterile culture flasks and test tubes containing complex mixtures of minerals, sugars, vitamins, and other substances. The intent is to determine the conditions necessary for continued growth of the isolated tissues and also to regulate the direction and extent of that growth. Our objective in doing this here at the Arboretum is to use this and related procedures to develop new techniques for plant propagation and to improve cultivated plants. The procedures being used and the techniques being developed represent applications of a field of plant science called plant cell and tissue culture.

Although plant cell and tissue culture has only in recent years begun to attract support and to show potential in solving problems in plant propagation, the field is not new to botanical research. It was shortly after the turn of this century that the German botanist, Gottlieb Haberlandt, published a paper entitled, "Experiments on the culture of isolated plant cells." In that paper, he described attempts to culture isolated or single vegetative cells from plants in simple mixtures of mineral salts. He felt that the results of such culture experiments should give some interesting insights into the properties of cells, and he also felt that the experiments would provide information about the interrelationships and influences to which cells within multicellular whole organisms are exposed.

Haberlandt's experiments were not entirely successful. Although his isolated cells did survive for a short time and occasionally increase in size, they did not go on to divide or to develop further. Nonetheless, his paper was a milestone in botanical research, for it represented a first attempt that opened the way for development of what is now a useful tool for probing basic biological questions, and for what promises to provide solutions to important horticultural and agricultural problems.

For two decades after Haberlandt's paper appeared, there was little success in plant cell and tissue culture. But in the early twenties, two researchers, one of them a student of Haberlandt, independently succeeded in growing isolated roots for some weeks in mixtures of mineral salts in solution. In the thirties, Philip R. White, an American, in another study of the nutritional requirements of isolated roots, demonstrated that with the use of carbohydrates and vitamins in addition to mineral nutrients, isolated tomato roots could be grown potentially indefinitely. The roots that he started were continued in culture for three decades.

At about the same time, White, in another study, and two Frenchmen, Gautheret and Nobécourt, all independently began studies of the growth requirements of masses of cells isolated from carrot roots. In the late thirties, each developed complex mixtures of nutrients which permitted indefinite growth of the tissues in

culture. The unorganized tissues, or callus as they are sometimes called, were the first true tissue cultures in the strictest sense of that term. Some of these callus cultures are still being maintained in laboratories around the world.

Since these early pioneering studies, a great deal of work has been done on the nutritional requirements of isolated plant tissues. Many more tissues from a wide variety of species have been cultured. Improvements in techniques and composition of the nutrient media—the mixtures of substances on which the tissues grow—have permitted smaller and smaller pieces of plant tissues to be cultured, making it possible, over half a century later, to accomplish what Haberlandt set out to do in 1902, namely, to induce single isolated plant cells to grow and divide. That success was not achieved sooner is not surprising if one considers the state of botanical knowledge in Haberlandt's time. The essentiality of some of the inorganic elements or minerals required for growth of plants was not recognized, nor had studies yet revealed the existence of a large number of organic compounds of various degrees of complexity that are involved in the growth of plant tissues. When these compounds were recognized, and as they became available, researchers were able to test their effects on growth of isolated plant tissues. Many were found to be essential for growth and their use facilitated further progress.

One result was that single cells not only could be induced to grow and divide, but also to regenerate intact plants. Such experiments elegantly confirmed the hypothesis that almost every cell in a plant under proper conditions was totipotent, or capable of regeneration into a whole organism. Such experiments also represented the ultimate in vegetative propagation, with nearly every cell in a desirable plant having the potential to become another intact plant.

Although for some these experiments seemed little more than laboratory curiosities, bordering on science fiction, they were more than that. The experiments illustrated how certain chemicals, plant hormones called auxins and cytokinins, regulated the direction and extent of plant development. Unorganized tissues treated with relatively high concentrations of auxin and low concentrations of cytokinin would develop roots, while those treated with relatively high concentrations of cytokinin and low concentrations of auxin would develop shoots. Intermediate levels of both hormones would result in continued growth of the unorganized tissue. Similar experiments provided insight into how other compounds were involved in the growth of plant tissues.

Modifications of the procedures involved, and use in more applied problems, has resulted in a technique called shoot apex culture. In this procedure, a shoot tip consisting of the tiny mass of dividing cells at the shoot's apex and a few of the very small undeveloped leaves adjacent to the apex, is placed on a complex nutrient medium. Under these conditions, the shoot tip is induced to continue growth and to develop roots. This technique, sometimes incorrectly referred to as meristeming or micropropagation, has been used to propagate such economically important plants as strawberry, asparagus, orchid, gladiolus, and carnation. In orchids the technique has revolutionized the marketing of certain rare and valuable clones. For example, shoot apex culture of a single orchid plant, and subsequent monthly subdivisions of the resulting tissue into four new plants, can give rise at the end of a year to well over a million progeny, each one identical to the original plant. Conventional propagation would yield only two or three plants.

There is considerable interest in adapting these and related procedures to more

plant species. Woody plants, including many ornamentals and most economically important forest trees, often cannot be propagated from cuttings; outstanding specimens must be propagated from seeds, and there is no guarantee that seed-propagated progeny will have all the desirable characteristics of their parents. Also, some species before they begin producing seeds may be 30 to 50 years old, a long time to wait for a plant breeder or forester who has only one lifetime to make significant progress in the improvement of a species.

Some problems remain, however, before these techniques can become routine. Often each plant species and sometimes each variety within a species has to have specific requirements met before it may grow in tissue culture. Unfortunately, progress in this field has not yet reached the point where one can predict with certainty how a particular plant will respond. Thus, it is not only necessary to attempt to adapt existing techniques to new species, but also to investigate the very basic problems of how a plant grows and develops. If the exact conditions were known that cause undifferentiated tissues to become transformed into highly organized tissues like roots, shoots, and leaves, one could utilize this information in directing the differentiation of tissues taken from whatever desirable plants that one might wish to propagate.

The future potential of tissue culture in plant propagation may not be nearly as important as its potential in plant breeding. The basic techniques in plant breeding have changed very little in the past 40 years. In that time, however, those techniques have permitted tremendous increases in the yields of many economically important plants. With the use of hybrids, yields of many crop plants have more than doubled. Unfortunately, such rates of increase are slowing, and many say that we are approaching what is called a yield plateau. For example, when hybrids first came onto the agricultural scene, potential yields of some crops increased at the rate of ten to twenty percent every few years. Nowadays, yields of those same crops are increasing, at most, at the rate of one to two percent annually, or somewhat less than the rate of increase of the world's population. Plant breeders are now at the point where their major efforts are concerned with modifying existing varieties in response to better and better adapted pests. The result is not an increase in yield, but instead an attempt to maintain current yields with the use of new and resistant crop varieties as the old varieties become susceptible to new strains of fungi and insects.

Plant breeders thus feel the need for an infusion of new techniques and knowledge. Bypassing the traditional methods and utilizing plant cell and tissue culture may be the answer. Plant tissue culture has already been of some value. For a number of years, when some potentially valuable plant hybrids were difficult to obtain due to incompatibility between the prospective parental stocks, removal and culture of the developing hybrid embryo as a kind of test tube offspring permitted obtaining a viable hybrid.

More recently, techniques have been developed which allow not just cultivation of single cells, but the isolation and culture of naked protoplasts, plant cells from which the cell wall has been dissolved by enzymes. Such naked protoplasts can reform new cell walls and go on to make entire plants. They can also be induced to fuse or to engulf particles like viruses(chloroplasts, and DNA strands. The implications are immense. Fusion of protoplasts from different plant species, thus bypassing the normal sexual process and all its incompatibility barriers, could result in new and valuable hybrids. This is not as far-fetched as it

Figure 1. *A small piece of tissue, in this case a section of twig, is treated to remove bacteria and fungi, and then placed in a test tube with a nutrient gel containing the minerals essential for growth, a carbohydrate for an energy source, one or more plant growth hormones, and a number of cofactors, i.e., vitamins and other complex substances.*

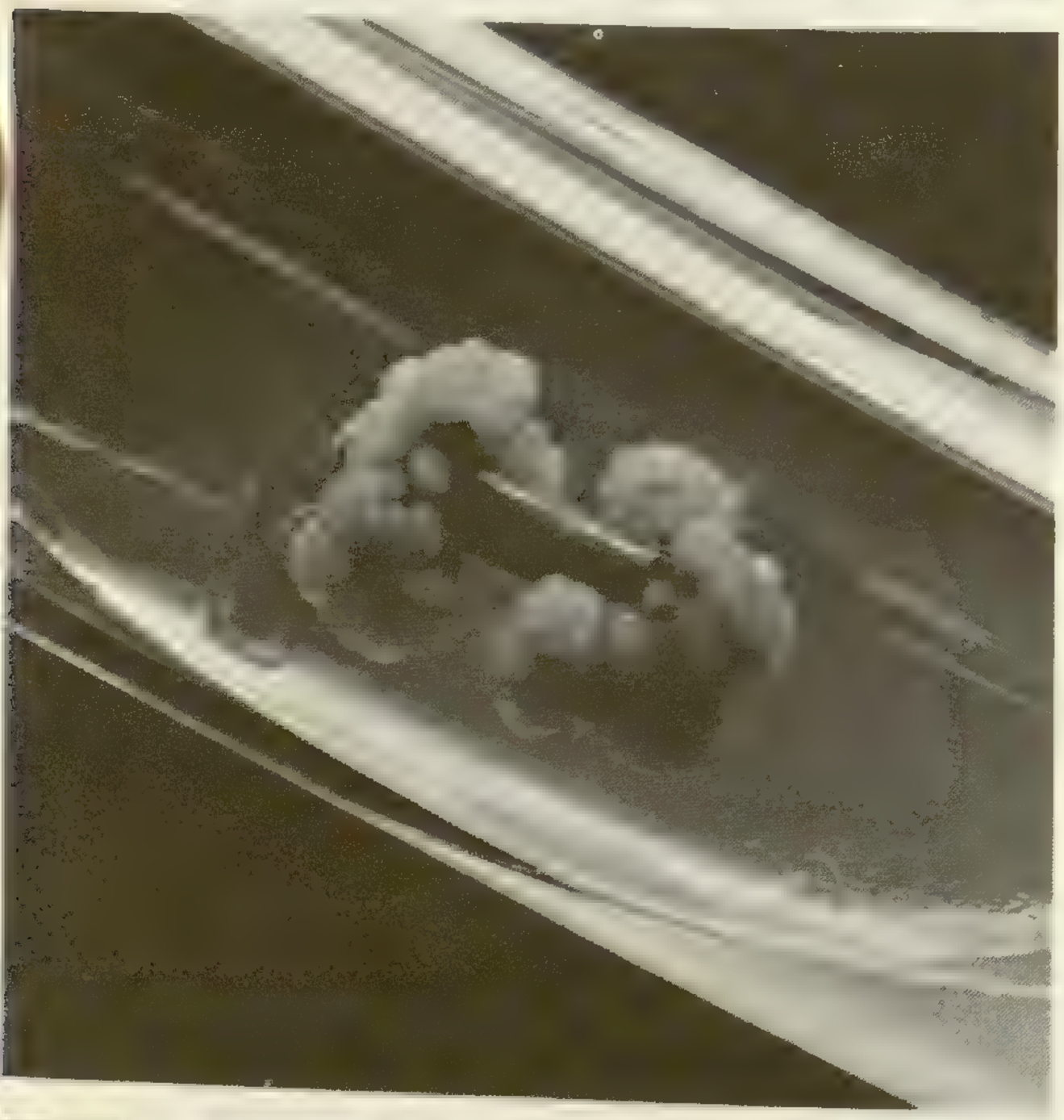


Figure 2. *If the right minerals, carbohydrates, growth substances, and cofactors are present, and if they are present in the right amounts, cells in the tissue will divide and grow forming a callus.*

Figure 3. *The callus can then be subcultured, i.e., transferred to fresh mixtures of nutrients which will stimulate further growth.*

Figure 4. *Adjustment of the kinds and amounts of nutrients added will determine how the plant grows. In this case the tissue has been induced to grow as single cells.*

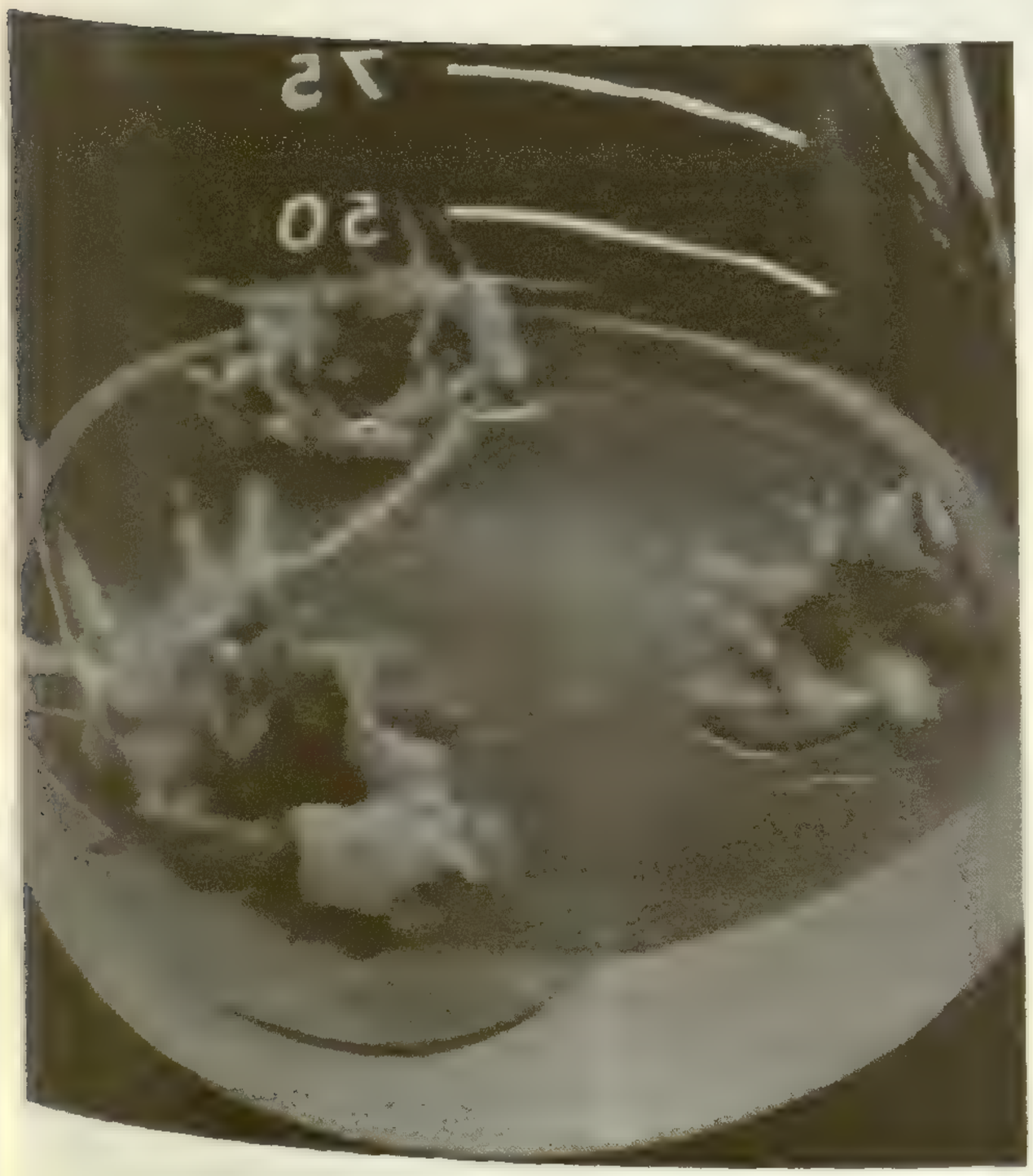


Figure 5. *Other combinations of nutrients may result in initiation of organized tissues like shoots or, as in this case, roots.*

Figure 6. *The intent is to obtain an intact plant with the leaves and roots that can be transplanted to soil to develop normally.*

may seem; it has already been achieved between two different species of tobacco.

Instead of transferring all the information from one species to another and creating a new hybrid, it may become possible to improve existing species by selective transfer of only part of the genetic information of another species. Plant physiologists now know that some plants are photosynthetically much more efficient than others. Among the efficient plants are corn and crabgrass; inefficient plants include wheat and soybeans. Since naked protoplasts have the capacity to engulf chloroplasts and mitochrondria, some have suggested replacing the photosynthetic apparatus of inefficient species with that from more efficient species. Others have suggested that instead of transferring the entire photosynthetic machinery it may only be necessary to transfer strands of DNA. This genetic information would allow the recipient cells to synthesize for themselves the more efficient forms of cellular machinery or enzymes. There has been a step in this direction. Tomato tissues, for example, cannot utilize the sugars galactose and lactose. But if strands of DNA are isolated from a bacterium that can utilize these sugars, and if the strands of DNA are then incorporated into the tomato cells, the cells develop the ability to grow using the two sugars.

Although we have not as yet been able to transfer functional strands of DNA from one higher plant to another, there is considerable impetus to do this. One application could involve the major food crops: corn, wheat, rice, and sorghum.

These crops require considerable amounts of nitrogen for their growth; they cannot, however, utilize the free nitrogen gas in the air, they can only use fixed nitrogen, nitrogen combined with other elements. Legumes such as the soybean have the ability to accommodate in their roots a bacterium which can convert free nitrogen to fixed nitrogen. There is tremendous interest in transferring this bacteria's ability to the major food crops. Although such a transfer would not increase the maximum yields now available, it would reduce the fertilizer inputs required. These fertilizer inputs are not only monetarily expensive, sometimes prohibitively so to farmers in underdeveloped countries, but they are today also expensive in terms of the amounts of energy required for their production and application. The nitrogen fertilizer needed to produce 150 bushels of corn on an acre requires for its own production approximately 3,000 cubic feet of natural gas. To the farmer in an undeveloped country, a grain crop requiring no nitrogen fertilizer would mean increased yields; to some in this country it could mean a warmer swimming pool.

Another potentially useful breeding technique using tissue culture avoids transfer of genetic material. Most plant tissues are diploid. That is, they contain two sets of chromosomes, one set derived from each parent. In diploid tissues a change or mutation occurring in one set of chromosomes is often not detected due to its being masked by the normal condition occurring in the other set of chromosomes. For this reason mutations are difficult to spot in diploid tissues. In haploid tissues, those where there is only one set of chromosomes, this is not a problem.

Haploids can now be obtained through the use of tissue cultures. Haploid cells are normally produced in the life cycle of a plant during gamete formation in the sexual process. Tissue culture under certain conditions stimulates those cells which ordinarily would develop into pollen grains to develop instead into a callus-like haploid tissue. When cultured on the right combination of plant growth hormones and other substances the haploid tissue may develop into a plant or it may be induced to grow as single cells or as more callus.

If haploids are grown as single cells and exposed to radiation, ultraviolet light, or certain chemicals, mutations can be induced. When so treated a single culture plate with thousands of individual cells may contain a significant number of mutations. These can be screened and analyzed for their potential usefulness. Although such procedures have been employed for years in microbiology, they are only now being applied to higher plants. Some potential applications of the method include screening mutants for resistance to toxins produced by disease organisms, or for resistance to or tolerance of herbicides or common environmental contaminants like the heavy metals zinc, cadmium, and nickel. As a tool to help unravel the complexities of biochemical pathways within the plant, the method could prove to be unsurpassed.

No one today seriously argues the potential of the techniques being developed in plant cell and tissue culture, but many problems do remain. What progress that has been made can now be applied to only a very small number of species. A tremendous amount of laborious experimentation will be necessary to extend the range of these procedures, and to realize the potential promised by the pioneering achievements in this field.

Dr. Loescher is a biologist in the Department's research division. His special interest is plant physiology, in particular the development of new techniques in plant propagation.

A Landfill Botanic Garden

Armand Sarinana

From rubbish dump to garden is the story of South Coast Botanic Garden. The entire story cannot be told in a single article, but this will serve as a beginning of a series of articles about South Coast Botanic Garden.

In 1960, the Los Angeles County Board of Supervisors realizing the values of arboreta and botanic gardens in both cultural and environmental needs of the comunity, took action which resulted in the formation of South Coast Botanic Garden. This botanic garden, located on the Palos Verdes Peninsula would, as studies showed, serve over a million people.

Much of the Palos Verdes Peninsula, and especially the site of South Coast Botanic Garden, was once part of an area covered by the Pacific Ocean in which lived microscopic algae called diatoms. When the ocean receded, it left behind their silicified skeletons in astronomical numbers forming the principal component of the native soil. The area presently the site of South Coast Botanic Garden proved to be so rich in diatomaceous earth that it was commercially mined for its use in the manufacture of industrial filters. Mining ended in the early 1950's when the yield became unprofitable. At this time the Los Angeles County Sanitation Districts purchased the land for a sanitary landfill.

The Sanitation District is concerned with all types of waste material produced by a county of seven million people. Among its many problems, solid waste has been an increasing problem as such refuse cannot be burned due to air pollution considerations. Once a sanitary landfill has been completed, the question of what use it is put to arose. The Board of Supervisors, the Sanitation Districts, the Department of Arboreta and Botanic gardens, as well as many interested citizenry, garden clubs, and horticultural organizations all pursued the matter intensely. Finally on April 8, 1961, ceremonies were held with over 400 people present in which the first five acres were turned over to the Department and planted.

Over the years, many problems brought about by the decomposition of trash have had to be dealt with. As an example, on two separate occasions, the developed lake bottom has cracked resulting in having to completely drain the lake. In both instances, the Sanitation Districts has assisted in fully repairing the lake. Through the handling of this as well as other related problems, a close relationship exists between South Coast Botanic Garden and the Sanitation Districts.

Photo by Frank Simerly.

An Arboretum is for people . . .

At South Coast Botanic Garden, a division of the Los Angeles County Department of Arboreta and Botanic Gardens, people have been served in a very special way. Just a little more than ten years ago, the present garden site consisted mainly of a huge hole filled with 3½ million tons of trash — in other words, a county dump. Today, it is a growing botanic garden, a landfill recycled by the addition of top soil, by land contouring, and by the combined efforts of dedicated horticulturists and forward-looking public agencies.

SCE

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BOOKSHELF

New acquisitions to LASCA Plant Science Library:

CHEMOTAXONOMY OF FLOWERING PLANTS, R. Darnley Gibbs. McGill-Queen's University Press, Montreal. 1974. 4 vol.

A DICTIONARY OF THE FLOWERING PLANTS AND FERNS, J. C. Willis, rev. by H. K. Airy Shaw. 8th ed. University Press, Cambridge. 1973. 1245 p.

A FLORA OF SOUTHERN CALIFORNIA, Philip A. Munz. University of California Press, Berkeley. 1974. 1086 p.

FLORA OF THE SAN JACINTO AND Santa Rosa Mountains, Dorothy Bryant. The Author, 1973. 12 p. mimeo.

A FLORA OF THE WHITE MOUNTAINS, CALIFORNIA AND NEVADA, Robert M. Lloyd and Richard S. Mitchell. University of California Press, Berkeley. 1973. 202 p. Illustrations.

GRASSES IN CALIFORNIA, Beecher Crampton. University of California Press, Berkeley, 1974. 178 p. Black and white and color illustrations.

A HANDBOOK TO PLANTS IN VICTORIA. Vol. 2. Dicotyledons, James H. Willis. Melbourne University Press. 1972. 832 p.

AN INTRODUCTION TO CALIFORNIA PLANT LIFE, Robert Ornduff. University of California Press, Berkeley. 1974. 152 p. Color illustrations.

HYDROPONIC GARDENING; the 'magic' of modern hydroponics for the home gardener, Raymond Bridwell. Woodbridge Press, Santa Barbara. 1974. 224 p. Illustrations.

HOW TO IDENTIFY MUSHROOMS (TO GENUS) USING ONLY MACROSCOPIC FEATURES, David Largent. Mad River Press. Eurepa, California, 1973. 46 p. Illustrations.

JOJ OBA: a wax-producing shrub of the Sonoran Desert. Literature review and annotated bibliography, Wade C. Sherbrooke and Edward F. Haase. University of Arizona, Office of Arid Lands Studies, Tucson. 1974. 141 p.

KNOW YOUR POISONOUS PLANTS; poisonous plants found in field and garden, Wilma Roberts James. Naturegraph Publishers, Healdsburg, Calif. 1973. Black and white and color illustrations.

NATIVE SHRUBS OF THE SIERRA NEVADA, John Hunter Thomas and Dennis R. Parnell. University of California Press, Berkeley. 1974. 127 p. Black and white and color illustrations.

PHLOEM TRANSLOCATION, M. J. Canny. University Press, Cambridge. 1973. 301 p. Illustrations.

SHOULD TREES HAVE STANDING? Toward legal rights for natural objects. Christopher D. Stone. William Kaufmann, Inc., Los Altos, California. 1974. 102 p.

SIERRA WILDFLOWERS: Mt. Lassen to Kern Canyon, Theodore F. Niehaus. University of California Press, Berkeley. 1974. 223 p. Black and white and color illustrations.

WILD FLOWERS OF THE CAPE PENINSULA, Mary Maytham Kidd. Oxford University Press, Cape Town. 1973. 94 p. Color illustrations.

STIGMAPHYLLON AFFINE (Cover)

Stigmaphyllon affine is a vigorous-growing evergreen vine native to Brazil. It is a current introduction of the Arboretum and is available there on a limited basis. Mature plants can be seen on the east fence of the Demonstration Home Gardens and in the Sunken Garden at the approach to the Demonstration Home Gardens.

The clusters of yellow flowers measuring up to four inches across are numerous and are borne in the fall when color is at a premium and, occasionally, a second time in the spring. Sometimes referred to as the orchid vine because the flowers resemble certain species of orchids, the flowers are well displayed against a dark green background of leathery, almost heart-shaped leaves.

The vine prefers a sunny location with a well-drained soil, but will withstand a variety of soils and exposures. It may be damaged by frost when the temperature falls below 26°F. for any extended period; young plants, therefore, may need protection until established.

Stigmaphyllon is a strong grower that will establish quickly if it is located in a happy situation. It develops into an excellent screen when used on trellises or fences.

ARBORETUM WEATHER

Long. 34d 08′ 48″ N.
Lat. 118d 02′ 59″ W.
Elev. 571.28 ft.

Weather season
Oct. 1 to Sept. 30

	Sept.	Oct.
Average daily maximum temperature	90.5	78.9
Average daily minimum temperature	59.8	55.0
Highest temperature	102	101
Lowest temperature	52	46
Number of clear days	14	5
Number of partly cloudy days	16	19
Number of cloudy days	0	6
Rain during this month	0	.95
Total rain since Oct. 1st	17.56	.95

Calendar

December, January, February, March

ARBORETUM, Arcadia

December 14, 15 — 8 to 5 p.m.
Camellia Show*
Southern California Camellia Council
January 18, 19 — Sat. 1 to 4 p.m.
Sun. 10 to 5 p.m.
Iris Show*
Presented by Southern California Iris Soc.
January 19 — 10 a.m.
Sunday Morning Walk*
"Australian Section"
Dr. Leonid Enari, senior biologist
January 25, 26 — 10 to 5 p.m.
Bonsai Show*
Presented by Baikoen Bonsai Kenkyukai
February 2 — 2 p.m.
Sunday Afternoon Lecture*
"Early History of the Arboretum"
Patricia Warren, historical curator
February 9 — 10 a.m.
Sunday Morning Walk*
"Historical Buildings"
Patricia Warren, historical curator
February 15, 16 — Sat. 1 to 5 p.m.
Sun. 9 to 5 p.m.
Camellia Show*
Presented by Temple City Camellia Society
March 2 — 10 a.m.
Sunday Morning Walk*
"Tallac Knoll/Aquatic Garden"
Frank Simerly, assistant director
March 9 — 2 p.m.
Sunday Afternoon Lecture*
"Gardening in Planters and Containers"
March 29, 30 — Sat. 1 to 5 p.m.
Sun. 9 to 5 p.m.
March 29, 30 —
Aril Show*
Presented by the Aril Society International
*Sponsored by Calif. Arboretum Foundation

DESCANSO GARDENS

December 6 — 1 to 4 p.m.
Red Carpet Preview
(members only)
Christmas Decorations Exhibit*
December 7-15 — 9:30 to 4:30 p.m.
Christmas Decorations Exhibit*
January 11 — 1 p.m.
Rose pruning and planting demonstration
February 9 — 10 a.m.
Sunday Morning Walk*
"Camellia Forest"
George Lewis, superintendent
February 14 — 8 p.m.
Theodore Payne Foundation Lecture
"California Succulents, Their Uses and Place in History"
Mrs. Joyce L. Tate, lecturer, member of Board of Directors of Cactus and Succulent Society of America
March 1, 2 — Sat. 1-5 p.m.
Sun. 8-5 p.m.
Annual Camellia Festival*
Presented by Southern California Camellia Society
March 16 — 10 a.m.
Sunday Morning Walk*
"Native Plants and Flowering Fruit Trees"
George Lewis, superintendent
***Sponsored by Descanso Gardens Guild**

SOUTH COAST BOTANIC GARDEN

Palos Verdes Peninsula

December 15-29
"Holidays in the Garden"
Christmas exhibits in the Information Center. The public is invited to attend a preview and tea on Dec. 15 from 1 to 3 p.m.
March 2 — 2 p.m.
Sunday Afternoon Lecture*
"Shade Plants"
Edward Hartnage, assistant superintendent
March 23 — 10 a.m.
Sunday Morning Garden Walk*
"East Bank and Pine Section"
Armand Sarinana, superintendent
*Sponsored by South Coast Botanic Garden Foundation

BIRDWALKS

ARBORETUM
1st Sunday of each month at 8 a.m.

DESCANSO
2nd and 4th Sunday of each month at 8 a.m.
Sponsored by San Fernando Audubon Society

SOUTH COAST BOTANIC GARDEN
3rd Wednesday of each month at 8 a.m.
Sponsored by South Coast Botanic Garden Foundation

March
1975
Vol. XXV
No. 1

Ozarka Leaves

Missouri Botanical
MAR 25 1975
Garden Library

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DEPARTMENT OF ARBORETA AND BOTANIC GARDENS
LOS ANGELES COUNTY

Arcadia, California 91006 • Telephone: (213) 681-5277

Francis Ching, Director; **Roy Ito**, Assistant Director; **Frank Simerly**, Assistant Director; **Lee H. Wakeman**, Executive Assistant. **Los Angeles State and County Arboretum:** John W. Provine, Superintendent; William Hawkinson, Assistant Superintendent; Earl Ross, Orchidist; Charles Lee, Horticultural Consultant. **Descanso Gardens:** George Lewis, Superintendent: **South Coast Botanic Garden:** Armand Sarinana, Superintendent; Edward Hartnagel, Assistant Superintendent. **Research Division:** Paul Cheo, Ph.D., Chief; Leonid Enari, Ph.D., Senior Biologist, Taxonomy and Plant Records Section; George Hanson, Ph.D., Senior Biologist, Research Section. **Education Division:** Tak Niiya, Chief; Patricia Warren, Associate Curator, History. **Public Services Division:** Donald S. Dimond, Chief.

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Editor
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Cover photo by Francis Ching.

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department notes

HALL OF ENVIRONMENTAL EDUCATION

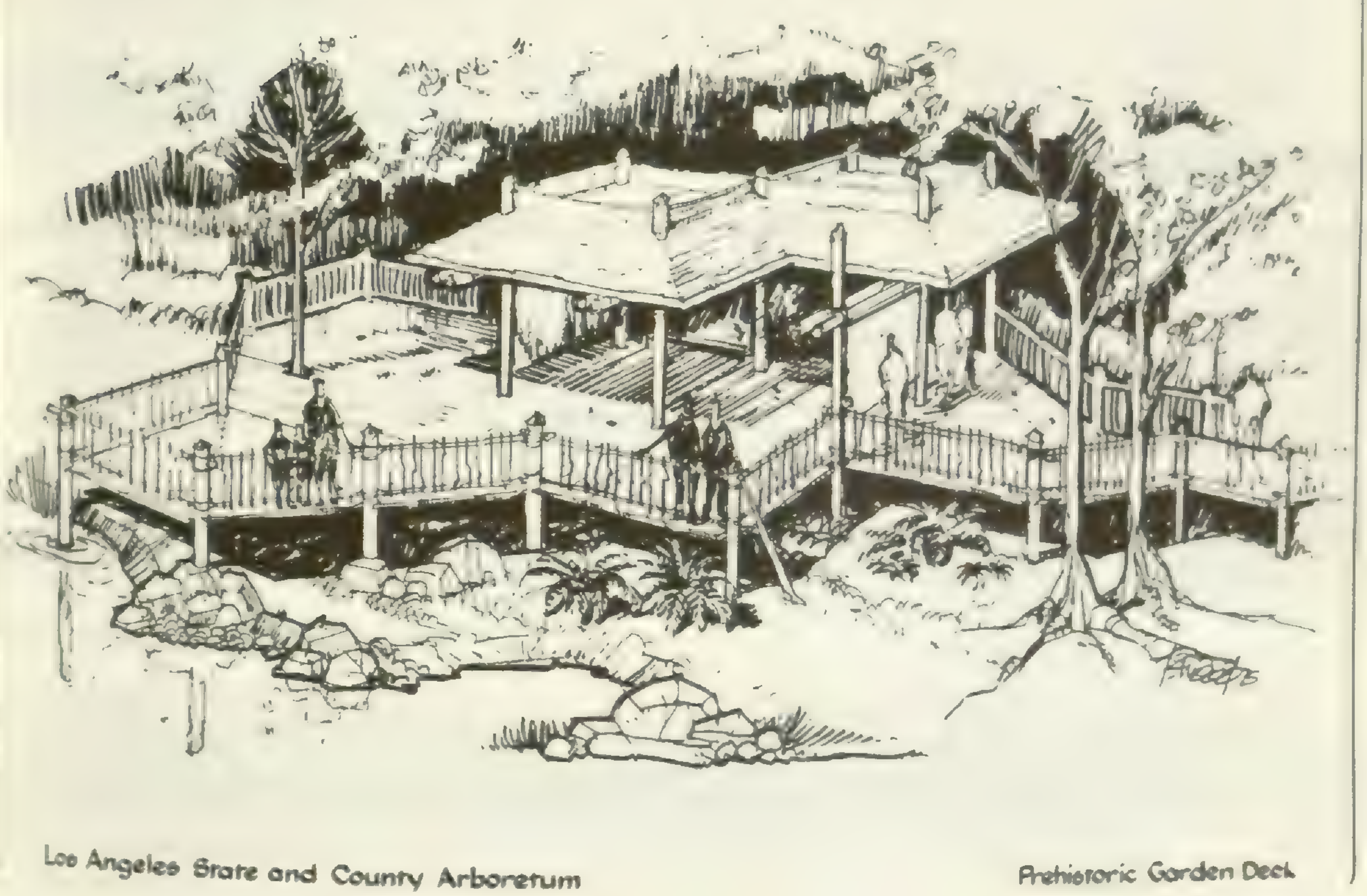
THE steady rise in attendance at the Arboretum has inevitably brought with it a demand for facilities adequate to serve the number of people interested in the programs offered. As noted elsewhere in this section, 761,000 people passed through Arboretum turnstiles last year, many of whom were unable to take advantage of various classes and services simply because there was not enough space to accommodate them. An even greater number of students were turned away for the same reason. To resolve this situation, a project program plan has been developed calling for the construction at the Arboretum of a Hall of Environmental Education. The plan has been reviewed by the Chief Administrative Office, the County Construction Commission, and the County Facilities Department and has been passed on to the Board of Supervisors for their approval. Work will begin immediately on the development of schematic plans, presentation drawings and renderings. The building will have an area of 23,250 gross square feet, allowing space for three classrooms expected to be in continuous use, a seminar room, an auditorium and exhibit area for flower shows and horticultural activities, a potting shed, a greenhouse, and essential office space. The CAF has pledged to raise $500,000 of the estimated $1.4 million cost of the building.

RECORD ATTENDANCE

ATTENDANCE at the Arboretum reached a new high in 1974 when 761,000 visitors passed through the turnstiles. The figure represents a 21 percent increase over 1973. Our director, Francis Ching, attributes the increase to a combination of greater public interest in improving their surroundings and the Arboretum's strong effort to provide programs of practical value. He cited youth and adult education classes in botany, horticulture and related subjects, mini-courses, Sunday morning garden walks, Sunday afternoon lectures, and special events like the Baldwin Bonanza and the Spring Extravaganza, as examples. Another index of the public's genuine interest in the various programs, he said, is the increase in membership in the California Arboretum Foundation which has grown in three years from 700 to 2,800 members.

TROPICAL GREENHOUSE

CONSTRUCTION of the tropical greenhouse at the Arboretum is expected to be completed early next month. The greenhouse will feature a small pool at one end that will spill two to three feet into a winding stream running the length of the building. Pedestrian paths will follow the stream and the earth will be contoured in a way to permit the most natural setting for the various plants. The size of the greenhouse and light intensity will necessarily place some limits on the kinds of plants, but visitors can expect to see a variety of tropical ferns, bromeliads, species of the orchid family, and plumeria, among others.



Los Angeles State and County Arboretum — Prehistoric Garden Deck

PREHISTORIC GARDEN AND JUNGLE

HIGH on the questions-asked list these days is "What are you doing in the jungle?" Well, the immediate work being done is preparing the clearing for the L-shaped viewing and display platform adjoining what will be the prehistoric garden. The overall plan calls for a number of clearing, replanting, and conservation projects beginning in the latter case with the 4-foot, green, vinyl-covered chain-link fence that now encloses the entire present jungle area from the road to the lagoon with entry and exit gates at both ends. Generally speaking, the jungle area will extend west from the viewing platform and north to the road, eliminating the lawn area where the weather station is presently located. This lawn and other areas will be planted with new material that will both broaden and maintain the jungle character.

The prehistoric garden promises to be a significant educational resource for the thousands of students who regularly make field trips to the Arboretum. It will not interfere with the existing bird habitat which will be left largely untouched; it will be protected by some fencing designed to prevent young people from damaging both bird and plant life.

HORTICULTURIST APOINTED

MR. TIM LORMAN was appointed Horticulturist at the Arboretum last December 2, taking the position formerly held by Arboretum Superintendent John Provine. A young man who has long had a special interest in tropical plants, Tim came to the Arboretum from the Sherman Foundation Garden in Corona Del Mar where his main responsibility was the new Tropical Plant Conservatory for which he collected and displayed orchids, bromeliads, ferns, and koi. With his wife, Frances, a native of Oxnard, California, Tim attended nearby Ventura College for two years, specializing in landscape horticulture, an area in which he won an "outstanding student" award in 1970. It was during this period that he began making field trips to the Arboretum, visits that whetted his interest in botanical gardens. Tim transferred to California Polytechnic State University in San Luis Obispo after receiving an A.A. degree at Ventura. He graduated with honors and a B.S. degree in ornamental horiticulture from Cal Poly in 1973. Shortly thereafter he joined the Sherman Foundation Garden. Tim is a member of the Orange County Bromeliad Society and the Los Angeles International Fern Society.

At the Arboretum, Tim will be responsible for the test stations Lux Arboretum, Palmdale, and Lancaster, for the Sunset Demonstration Home Gardens, and the nursery unit comprising 17 greenhouses which include one of the largest orchid (species) displays in the country. He will work on redesigning the Begonia House as a landscaped display area, and will soon begin collecting plants and setting up displays for the new Tropical Greenhouse. This latter will be a particularly congenial task for Tim because of his interest in collecting tropical plants, especially showy, variegated species of bromeliads. This interest began with a chance visit to the Jungleland Nursery of Dave Barry, Jr., who has one of the more extensive collections of bromeliads, and was further stimulated by trips the past two years to Hawaii where he explored botanical gardens and the lush valleys of the islands, returning with additions to his already extensive collection at home.

Photo by William Ap[illegible]

Tim Lorman

In addition to helping coordinate the forthcoming Baldwin Bonanza, Tim will also give lectures at the Spring Extravaganza, lead Sunday walks through the greenhouses, and teach a mini-course on bromeliad identification and culture.

BALDWIN BONANZA V

LIKE every good publicist, Marilynn Bochte of Las Voluntarias knows that life for editors is made easier if facts exceed rhetoric by a healthy margin. Asked for information on how plans are

Photo by William Aplin

"Living sculptures," hanging pieces of driftwood, palm, manzanita and cork oak planted with ferns and bromeliads, will be offered for the first time at this year's Bonanza at the Arboretum. Pictured are some bromeliads (Tillandsia ionantha) *growing in sections of cork oak* (Quercus suber), *the roots covered by sphagnum moss held in place by pieces of chicken wire. Cork oak is used because it retains moisture and because its rough surface allows bromeliad roots to adhere easily. Visitors who buy these at the Bonanza will learn that they do best indoors where humidity is higher but they will survive outdoors as long as they are not subjected to freezing weather. They have purplish flowers that bloom for several weeks.*

progressing for the forthcoming Baldwin Bonanza, she supplied the following: "The fifth annual Baldwin Bonanza will be held at the Arboretum on Sunday, April 6, 9:00 a.m. to 4:30 p.m., according to Mrs. Todd Taylor, chairman. In essence, a botanical fair, the Bonanza is sponsored by Las Voluntarias, the volunteer arm of the California Arboretum Foundation. Most of its over 200 members have been hard at work for many months potting plants and making craft items.

"Highlight of the Bonanza will be the sale of many Arboretum introductions, among them *Tabebuia chrysotricha* (Golden Trumpet Tree), *Hibiscus huegelii* (Blue Hibiscus), *Cassia leptophylla* (Gold Medallion Tree), *Xanthorrhoea quadrangulata* (Australian Black Boy), *Stigmaphyllon affine* (Orchid Vine), Chorisia 'Los Angeles Beautiful,' Gazania 'Sun Gold' and 'Sun Burst,' and *Koelreuteria integrifoliola.* Other plants to be offered include ferns, sinningias, begonias, herbs, palms, pelargoniums and orchids, plus dry arrangements, craft items, and hanging baskets.

"New this year will be the "living sculpture" creations. These are hanging pieces of driftwood, palm and manzanita, planted with ferns and bromeliads. Another popular item will be the vegetable booth where vegetables that can be successfully grown by the home gardener will be available in pots and flats now being prepared by volunteers.

"Donations are needed for the 'collectables' booth — such items of interest to collectors as old photographs, old laces, linens, doilies, any crochet or needlepoint, clothing of the 1920's or before, Victorian glassware, china and silver, depression glass, unusual bottles, old pieces of music, books on California history and the West or on horticulture and children's books of any period. Donations may be left at the Santa Fe Depot at the Arboretum, or call the California Arboretum Foundation, 447-8207, to arrange for pickup.

"Las Voluntarias members are conducting a raffle for prizes to be awarded at the Bonanza, including a set of Brown Jordan patio furniture and a patio lath house from Southern California Greenhouse Manufacturers. Tickets may be purchased from members or by calling the Foundation office. Foundation members and their guests will receive invitations to a special Bonanza Preview Party, Saturday, evening, April 5, from 6 to 9 p.m."

As everyone knows, proceeds from each Baldwin Bonanza have contributed greatly to various Arboretum projects. The proceeds from this year's Bonanza will go toward the biggest project to date, the Hall of Environmental Education.

SPRING EXTRAVAGANZA

Last year's Spring Extravaganza at the Arboretum attracted nearly 28,000 people during its two-day run thereby placing it more or less in a tie with the Baldwin Bonanza (13,000 people for one day) as the most popular event of the year. This year's Spring Extravaganza, scheduled for Saturday and Sunday, May 17 and 18, can be expected to do as well or better, given the even greater range of activities planned. Sponsored jointly by the California Arboretum Foundation and the Arboretum, the event consists of two home gardening and horticultural field days divided in to four main categories: plant clinic, exhibitions, demonstrations and lectures, and special events.

The plant clinic speaks for itself. Visitors bring their plants—or their problem alone — to the clinic booth where a panel of experts will offer diagnostic services and corrective recommendations

The vegetable gardening demonstrations at last year's Spring Extravaganza at the Arboretum attracted large audiences as can be seen in this picture showing Tak Niiya, education chief, explaining, and Ron Call, education specialist, demonstrating. This year, two additional vegetable gardening demonstrations will be offered during the two day event plus lawn-planting demonstrations in the same area conducted by Armand Sarinana, superintendent of South Coast Botanic Garden.

A dozen plant societies will stage exhibitions of their specialties: hemerocallis and amaryllis, epiphyllum, cactus and succulent, cymbidium, herb, rose, iris, daffodil, bonsai, begonia, orchid, and general horticulture. Demonstrations and lectures will be given during show hours, 8 to 5 p.m. both days, on thirteen different subjects: vegetable gardening, cutting, grafting and layering, composting, container gardening and hanging baskets, herbs, bonsai, roses, lawns and groundcovers, orchids, cacti and succulents, gladiolus, house plants and terrariums, and daffodils.

Special events will include open-house sessions in the Arboretum's plant science library, research laboratory, orchid and begonia houses, tropical greenhouse, and nursery and growing houses. Displays will include the Sunset Demonstration Home Gardens, groundcovers, turfgrasses, junipers, Garden For All Seasons, and mulches and soil amendments. Finally, there will be a limited sale of Arboretum introductions and specialty plants. All in all, just about everything the home gardener might wish to see or learn about will be available for his consideration. May 17 and 18 are dates to save!

VOLUNTEERS

MITZI MOORE, president of the Arboretum's Las Voluntarias, welcomed 46 new volunteers last January 13 at the first of three orientation sessions that acquaint newcomers with Arboretum programs, staff, and facilities. At the end of the orientation, all shed their provisional status and became full-fledged members of Las Voluntarias except one, a gentleman who joined Los Ayudantes, the all-male volunteer contingent which presently has ten members. All together, the volunteer corps now numbers over 200.

SHADE TREE CONFERENCE

THE Southern California regional meeting of the Western Chapter International Shade Tree Conference and the Street Tree Seminar, Inc., was held in the lecture hall of the Arboretum last January 10. Some 200 members gathered for an all-day session of addresses and discussions with breaks for coffee and lunch. Arboretum Director Francis Ching led off with a talk on "The Arboretum In These Changing Times," followed by a talk by Dave Dyer, deputy agricultural commissioner for Los Angeles County, on "Understanding the Current Pesticide Rules, Regulations, and Regalia." Victor B. Youngner, professor of agronomy at U.C. Riverside spoke on the "Use of Sewage Effluent For Landscape Irrigation," N. Keith Abbott, city manager of Whittier, spoke on "Management Training," and Sigmund Arywitz, president of the AFL-CIO Los Angeles County Federation of Labor, wound up the formal part of the proceedings with a talk on "Labor Looks On These Changing Times." Louis Hernandez, park superintendent of the City of Orange, presented a scholarship award by the Street Tree Seminar, Inc., after which most of the members took a tram tour of the Arboretum and returned for the traditional hospitality period which concluded the meeting. Las Voluntarias of the CAF were the hosts for the meeting, taking care of registration, coffee, luncheon and hospitality.

FIESTA AT SOUTH COAST

THE annual Fiesta de Flores at South Coast Botanic Garden will be held a month and a half earlier this year — on May 10 and 11, to be exact — for reasons having mostly to do with weather and horticulture. The South Coast Botanic Garden Foundation, which is presenting this major event of the year at the garden, has selected for the fiesta theme, "A Garden of Beauty For All People." In addition to flower exhibits, flower-arrangement demonstrations, lectures on gardening and plant sales, local artists and craftsmen will display their wares; the Amigos del Jardin, garden volunteers, will conduct walking tours and story-telling sessions for young children, musicians and dancers in the community will offer mini-concerts, and finally, an outdoor cafe will be set up to provide visitors with sustenance and relaxation between events. Dr. Paul Saffo, Foundation president, has appointed three Foundation officers to coordinate the staging of the fiesta: Mrs. Cleona Crozier, Mrs. Helen Pickett, and Mr. Eugene Hillman.

DEMONSTRATION PATIOS

A CONTRACT has been awarded by the County Board of Supervisors for the construction of two exhibit patios at Descanso Gardens. Part of a demonstration garden development, they will be used as models similar to those in the

Last year's plant sales at Fiesta de Flores will be repeated this year. Sale chairperson was Mrs. Peggy Ishimine, center, shown with co-members of Amigos del Jardin.

Sunset Demonstration Home Gardens at the Arboretum, for flower shows, and for various gardening demonstrations. Designed by the Department's consulting landscape architects, Lang and Wood, one will be a tri-level, 1,800 square foot area with brick floor and wood lattice-work overhead; the other will be approximately half that size, single level, but with raised wood decking. Two other similar but smaller patios have already been constructed, one by the Descanso Gardens staff, the other by Tom Matsuoka, owner of the Fair Oaks Nursery in Pasadena, who also supplied the materials. Plans for a fifth patio have been donated by landscape architect Larry Moss. It will be constructed when funds become available. All the patios will be located in the area that was formerly the site of the famous Descanso night-lighting festivals and placed so as not to interfere with garden landscaping and plantings.

NATIONAL ARBORETUM

WHEN the National Arboretum was established in Washington in 1927, the act that brought it into being included an authorization for the appointment of an Advisory Council whose function would be to "counsel and advise on the most critical needs and to suggest methods of accomplishing the Arboretum's immediate and long-term objectives in the areas of research and public education."

The recommendations of the Council, which meets for a 2-day period once a

year, are directed to the Secretary of the U.S. Department of Agriculture under which the National Arboretum operates. Members of the Council serve for two years and are generally drawn from the staffs of leading botanic gardens around the country. Secretary Earl L. Butz, who currently heads the Department, has invited our director, Francis Ching, to serve as a member of the new Council being formed which Secretary Butz believes faces some unique challenges in view of the environmental problems that exist everywhere in the country today.

ENTRANCEWAY

FURTHER progress in the development of the vehicle entranceway to the Arboretum has been achieved with the completion of the fountain set in the curve of the entrance road off Baldwin Avenue. Designed by Lang and Wood, the landscaping and environmental planning firm responsible for laying out the entire entry complex, the fountain and pool are totally automated. Lights and operational periods are determined by a preset timer and a wind sensor shuts the fountain off when winds get too high.

Los Angeles State and County Arboretum — Entrance Fountain

PLANT PORTRAITS

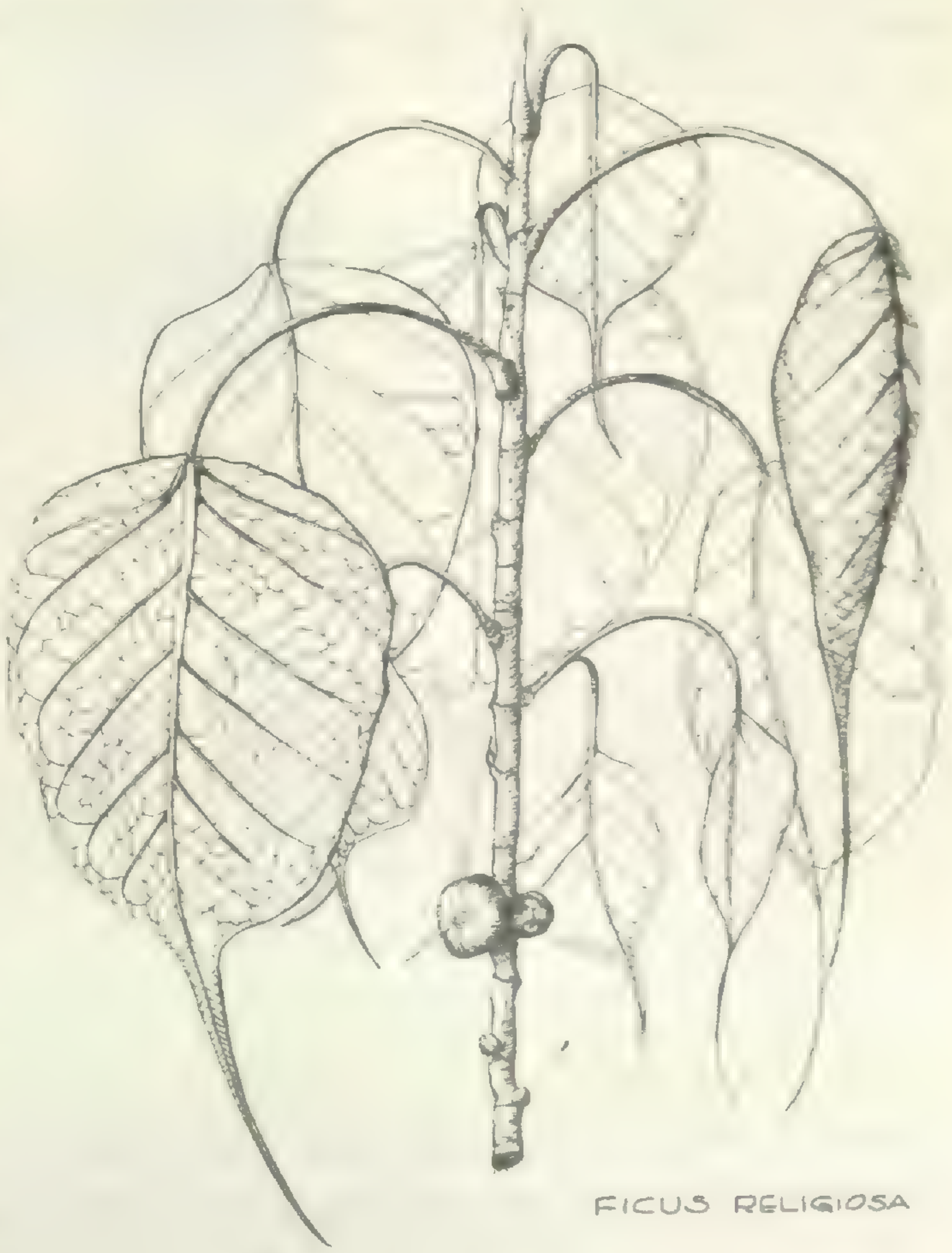
Bo Tree

Leonid Enari

ACCORDING to tradition, it was under a bo tree in the village of Uruvala (now Buddh Gaya) in central Bihar in northeast India, that Siddhartha, an Indian prince, meditated for seven weeks on a couch of grass, facing the east, until he obtained enlightenment and perfect knowledge of Nirvana, from which time he became known as Buddha. This may or may not be true, except that Siddhartha existed, lived about 2,500 years ago, was the son of a rajah, and is the founder of Buddhism, a religion which originated in India and later spread to China, Burma, Japan, Tibet, and parts of southeast Asia.

The bo tree, or the peepul tree as it is sometimes called, is held sacred both by Buddhists and by the Hindus. It is considered a sin for any devotee to cut it down, harm it, or utilize a part of it in any manner. When Dr. W. S. Stewart, the former director of the Los Angeles State and County Arboretum, visited the famous bo tree of Buddh Gaya in 1964 and sought permission from the superintendent to take a cutting for the Arboretum, his request was politely but firmly refused. Instead, he was given a few dead branches and leaves already separated from the tree by wind.

The bo tree is a large, spreading tree that grows to 100 feet. The trunk is short, erect, and, on old trees, with ridges, knobs, and hollows. The branches are long, crooked, and spread widely in all directions. The lower branches are nearly horizontal and are sometimes supported by thick roots that serve as additional trunks. The bark is fairly smooth and grayish and peels off in roundish flakes of irregular size. The leaves are somewhat egg- or heart-shaped, smooth, deep-green above but paler beneath, shiny, leathery, with long pointed tails and slender pendulous stalks. They are adapted for life in very wet climates because the tail causes raindrops to drain away quickly



FICUS RELIGIOSA

from the surface of the leaf, thereby allowing it to resume its respiratory functions soon after the rain stops. The receptacles (figs) are small, purplish-black when ripe, and much liked by birds. As its Latin name, *Ficus religiosa,* indicates, the bo tree is a species of fig.

The figs are eaten by birds, squirrels and monkeys which drop the seeds on the branches of other trees, where they germinate and grow. The host tree, which at first supports the intruder, eventually is strangled by its strong encircling roots and succumbs. This does not mean that the bo tree is a parasite. It takes no food from the host tree, relying on air and rain until its roots reach the ground. When the seeds germinate in the ground, the tree develops a single trunk and behaves very much like any other ordinary tree.

The bo tree is indigenous to Bengal, near the foot of the Himalayas. It is frequently planted throughout India and Burma, except in very dry regions. Planting a bo tree in front of a dwelling is supposed to bring happiness and prosperity to the occupant or owner. And to keep the tree happy, it is often married, the nim *(Azadirachta indica)* or the banana frequently chosen as the bride. A wedding ceremony is celebrated between the two when they are planted side by side.

At the Los Angeles State and County Arboretum the bo tree can be found in quadrats L/10 and 0/13. It is a sight to see their poplar-like pendant leaves fluttering and dancing in the slightest breeze. The accession in 1/10 was donated to the Arboretum in 1951 in a five-gallon container by Dr. Ira J. Condit, author of "Ficus, The Exotic Species" and Professor Emeritus, Department of Horticulture, University of California, Riverside. It was planted in the present location in 1952. The accession in 0/13 is the cutting taken from the donated tree in 1951.

Photo by William Aplin

Bo tree located in Tropical Garden atop Tallac Knoll.

The author is much indebted to Mrs. Paty Lawson, a member of the Arboretum's Las Voluntarias, for the drawing she made for this article.

Living Safely in the Hills

Kenneth R. Montgomery

URBAN development in Southern California prior to the 1930's was confined for the most part to relatively well-defined cities and towns located on the coastal plain and in the coastal and milder interior valleys. The various communities were separated by large areas of open land covered with native oaks, grass and wildflowers or planted to citrus and a wide variety of other agricultural crops. In recent years, particularly since World War II, people in large numbers from all over the country have immigrated to Southern California. The most dramatic population increase has taken place in Los Angeles County. From slightly more than 2 million people in 1934, the number exploded to 6 million by 1960 (Ford 1961) and to about 7 million in 1967 (Salitore 1967). To accommodate such an increase, much of the flat, easily accessible land between existing communities was cleared for construction of homes, shopping centers, roads and schools.

The pace at which the countryside has been subdivided is staggering. In the mid-1950's, for example, a land developer boasted that during the preceding year an average of 1,000 trees per day were removed from Los Angeles orchards to make way for new homes. (Ford 1961). By progressive elimination of open space, the pattern of urban growth in the greater Los Angeles area has resulted in the creation of a sprawling megalopolis fingering its way over several thousand square miles.

As the valleys and coastal lowlands filled up and as people began to look for an escape from crowded city life, urbanization has pushed relentlessly into the foothills of the surrounding mountains. Large-scale subdivision in these areas has set the stage for an almost unprecedented confrontation between man and the natural environment. At the very heart of the confrontation is the fact that the foothills — because of the nature of the vegetation, climate and topography — are not well suited, and are, in reality, hazardous, for urban development.

The dominant vegetative cover on the slopes of the Southern California mountains is composed of dry, evergreen

Saturday

APRIL 5

6 to 8 p.m.

Preview Night for
Members and their Guests

(Reservations Required)

Baldwin Plaza V Bonanza

PLANTS · ANTIQUES · BOUTIQUES

Spring Extravaganza

Two Home Gardening and Horticultural
Field Days for the General Public

PLANT CLINIC · EXHIBITS
DEMONSTRATIONS · LECTURES
SPECIAL EVENTS

MAY 17&18

8 a.m. to 5 p.m.

shrubs known as chaparral. One of the most conspicuous features of chaparral is its high susceptibility to recurring fire (Hanes 1971). The climate of the foothills, the density of the cover and the oily nature of the plants combine to make chaparral one of the most explosively flammable vegetation types in the world. The ecological significance of these fires and their relation to man have been discussed in a previous *Lasca Leaves* article (Montgomery 1972). The important point to emphasize here is that wildfires in the chaparral pose an enormous threat to the lives and property of hillside residents. When chaparral-covered areas were sparsely settled, fires were not much of a problem. With increasing urban pressure, however, the situation has become critical and continues to worsen each year. Conservative estimates are that over one-half million people in Los Angeles County alone live in areas of moderate to high brush fire danger (L.A. County Forestry Division, personal communication). During the dry season of late summer and fall and particularly when dry Santa Ana winds are blowing, these people find themselves surrounded by plant fuel with an energy content in each 40 acres equal to that of the atomic bomb dropped on Hiroshima. All that is required to release this energy is a careless smoker or a child playing with matches.

In addition to fire, the extreme steepness and instability of the mountains contribute to the danger of living in the hills. There is a continuous, often rapid movement of soil, fractured parent rock and organic debris down the slopes, either carried by surface water runoff or in response to gravity (dry creep and landslides). The deep, extensive root systems of chaparral shrubs help anchor the slopes, and the vegetative cover provided by the plants serve a vital function in controlling water runoff and soil erosion. When the protective cover is disturbed by fire or by construction activities, disastrous floods and mud slides during winter rain storms frequently occur. The resulting loss of human life and property in the hills and in the canyons and valleys below can be very great, with damages known to equal or even exceed those of major brush fires.

Because of the hazards that chaparral areas pose, fundamental questions have been raised concerning the wisdom of undertaking extensive urban development in the foothills. These questions were brought into sharp focus at a two-day meeting held at the University of California, Riverside in the spring of 1973. The meeting, entitled "Symposium on Living with the Chaparral," was co-sponsored by the Sierra Club, the U.S. Forest Service and the California Division of Forestry. Proceedings of the symposium have recently been published (Rosenthal 1974). Although there was a wide diversity of ideas expressed, opinions seemed to polarize around whether urbanization in the hills should be prohibited altogether by zoning restrictions and other means or whether we should attempt to modify the chaparral environment in some way to more safely accommodate urbanization.

From an idealistic point of view, it might be nice to think of the foothills as being off-limits for urban development. But the fact is that large areas have already been subdivided, and because of the largely unplanned, diffuse nature of this growth, the zone of contact or interface between homes and the hazardous wildlands is alarmingly extensive. We must face the reality that hillside development is here to stay and is almost certain to increase in the future. The critical issue is how to make it relatively safe for people to live in these areas while, at

the same time, insuring that impact on the chaparral ecosystem is as small as possible.

A basis for living safely in the hills lies in two distinct, yet interrelated, considerations — a) proper construction practices and b) modification of the vegetative cover at the urban-wildland interface. As Youngner (1970) points out, the first step is to build all structures using nonflammable or fire-resistant materials. Only tile or asbestos composition roofs, for example, should be allowed in fire danger areas. Roofs constructed of wood shake and shingles pose a great fire hazard as was dramatically illustrated in the Rolling Hills fire in June of 1973. Twelve expensive homes were destroyed in this fire; every one had wood shingles and had caught fire by means of burning debris (fire brands) landing on the roof. Besides the use of fireproof building materials, there are a number of other construction requirements that should be established to help reduce the wholesale destruction of hillside homes in brush fires. These requirements, many of which are related to architectural design and to the positioning of a structure (e.g. in a canyon bottom or at the top of a ridge) are beyond the scope of the present discussion.

Modification of the vegetative cover around hillside homes and other structures is as important for living safely in the hills as proper construction practices. Several approaches to modifying plant fuels will be examined in the following paragraphs. The primary objective of each is to physically separate urban development from the highly flammable chaparral. At the present time, fire safety ordinances in Los Angeles County call for a minimum clearance of 100 feet around structures in which all brush must be removed for the first 30 feet and reduced to 18 inches in height for the next 70 feet. When the native vegetation on the slopes is removed or substantially reduced, however, the danger of soil erosion and excessive water runoff increases dramatically. Clearly, plant cover of some type must be maintained.

Biologists at the Arboretum have been concerned with this problem for over 20 years. The idea of using plants of low flammability ("fire retardant") for landscaping around homes and for planting in wildland areas along roadsides and around campgrounds was proposed as a means of reducing the danger of fire while at the same time providing vegetative cover (Martin and Juhren 1954, Ching 1959, Ching and Stewart 1962, Montgomery and Cheo 1969). During the past four years, our efforts have been concentrated on developing the concept of green belts (Montgomery and Cheo 1970, Montgomery and Stallings 1970, Montgomery 1973). A "green belt" is defined as a protective zone at least 100 feet wide around structures that have been completely cleared of the native chaparral vegetation and landscaped with low fuel - volume, fire-retardant plants (Fig. 1 and 2). The planted area must then be watered regularly during the dry season and maintained by weeding, removing plant debris and renovating periodically to keep the fire hazard low.

Green belts have proven to be highly effective in slowing or stopping the spread of brush fires and in reducing the intensity of the heat produced. Even a relatively small decrease in the rate of fire spread or intensity can be of great importance because it gives firemen more time to save lives and property. A good example of the value of green belts is provided by the fire in Rolling Hills. A number of homes escaped damage due, in part, to the presence of well-watered-and-maintained ground cover vegetation, notably various types of iceplant and Al-

FIGURE 1. *A green belt landscaped with iceplant* (DROSANTHEMUM *sp.*) *serves to separate this hillside home from flammable shrubs and weeds at the bottom of the slope.*

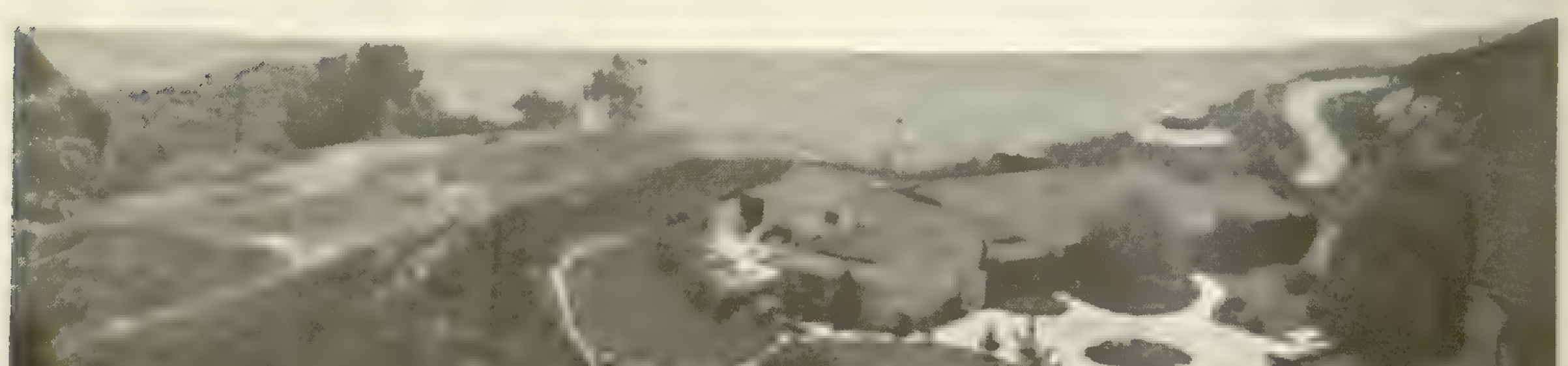


FIGURE 2. *This home in Rolling Hills was surrounded by fire in 1973 but escaped serious damage, in part, because of a well-maintained green belt of Algerian ivy* (HEDERA CANARIENSIS). *Burned areas can be seen on the left and in the lower right-hand corner of the photograph.*

gerian ivy *(Hedera canariensis)*. In more than one case the fire died out in the fire-retardant vegetation before reaching structures.

Establishment of an effective green belt involves considerably work on the part of the homeowner to clear the brush and plant ground cover species. Also, the expense can be quite high. Green belts require irrigation throughout the dry season to maximize fire retardance and to make possible the survival of ornamental plants, few of which are adapted to environmental conditions in the hills. When water is provided, maintenance costs for weed control and for removal of the rapid build-up of dead plant fuels generally increase. Because of these features, green belts must be characterized as a relatively high-maintenance approach to fuel modification. They are best suited for use immediately around homes where it is most realistic to install irrigation systems and where residents are willing and able to give the amount of care necessary to maintain the planting.

Another approach to modification of the vegetation in hillside residential areas has been popularly called "landscaping with natives." Here the native chaparral cover is not completely removed from around a structure. Instead, the vegetation is thinned by selective removal of certain shrubs and by pruning and shaping those that are allowed to remain (Fig. 3). The result is to break up the community of the plant cover and reduce the overall quantity (volume) of fuel available for burning, thereby lowering the fire hazard. It is often considered desirable to get rid of all individuals of highly flammable species such as chamise

FIGURE 3. *The vegetation around this structure has been modified according to the concept of landscaping with natives. Many chaparral shrubs were allowed to remain for soil erosion control and for their beauty. Part of the area also has been planted with drought-tolerant, low fuel-volume shrubs.*

(Adenostoma fasciculatum) and black sage *(Salvia mellifera)* while retaining as many individuals as possible of somewhat less flammable species such as toyon *(Heteromeles arbutifolia)* and manzanita *(Artostaphylis spp)*. Areas between shrubs are kept clean and free of weeds by a program of routine maintenance. Since native species are well adapted to the harsh climate and poor soils of the foothills, no supplemental water is provided during the dry season, and very litle care is required for the plants to thrive.

The concept of landscaping with natives also includes interplanting with low-growing, drought-tolerant native and exotic species between the remaining chaparral shrubs. Among the best natives are dwarf coyote bush *(Baccharis pilularis* var. *prostrata)*, creeping sage *(Salvia sonomensis)* and certain species of *Ceanothus* and manzanita. Introductions that are well adapted to the foothill environment includ low-growing forms of rockrose *(Cistus)* native to areas around the Mediterranean Sea, creeping saltbush *(Atriplex semibaccata)* from Australia and Caucasian artemisia *(Artemisia caucasica)* from southeastern Europe. Many of these species have considerable ornamental potential and can add to the beauty of hillside landscaping.

By comparison with green belts, landscaping with natives represents a low-maintenance approach to fuel modification. "Low-maintenance zones" created in this way are more compatible with the environment of the foothills and, therefore, are generally easier to establish and cheaper to maintain. They are best suited for large areas where irrigation cannot be provided and on very steep, unstable slopes where it is impractical or even undesirable to clear and hand plant with ornamental cover species. The major shortcoming of low-maintenance zones lies in the fact that direct protection from fire is not as great as can be achieved with green belts. Maire and Goodin (1967) summarize this point by saying that although unwatered landscapes can be prevented from becoming a fire hazard, they will not equal the safety of watered areas landscaped with ground cover plants, especially succulents.

In addition to green belts and low-maintenance zones, the use of trees in the landscape might also be considered in hillside residential areas. It has been observed that a grove or row of well maintained trees can be of value under certain conditions in protecting homes from brush fires (Maire and Goodin 196-) The trees, acting much like a wind break, can provide a vertical barrier to prevent fire brands from landing on and igniting a roof. In addition, the screening effect helps divert the enormous heat of a fire up and away from structures. The effectiveness of this approach is largely dependent upon the location, spacing and care of the trees. Of primary concern is that the trees be kept well watered and free of dead lower branches and that surface litter be kept from accumulating. They should be placed near but not overhanging or touching a structure. Furthermore, they must be positioned between the structure and the probable direction of a fire. Little is known about whether certain types of trees are better than others for use as a fire barrier, but most species of pines and *Eucalyptus*, because of their notoriously high flammability, probably should be avoided.

An idea that shows a great deal of promise is combining green belts and low-maintenance zones in an integrated approach to fuel modification. Briefly, this involves the creation of a double line of defense against brush fires utilizing green belts of some desired width immediately around homes which, in turn, are surrounded by low-maintenance zones

FIGURE 4. *A combined approach to fuel modification is illustrated here. The slope below the home is maintained as a green belt and receives irrigation throughout the fire season from a sprinkler system. Beyond the green belt is a low-maintenance zone created by landscaping with natives. Wildland stands of dense chaparral occur beyond the low-maintenance zone.*

FIGURE 5. *In this drawing an "integrated zone" around homes in a hillside residential development is shown as it might appear from the air.*

An example of the effectiveness of a green belt separating homes from chaparral. In this photograph, taken toward the end of the Rolling Hills fire referred to in the text, the fire burned up to the well-irrigated ground cover vegetation but did not ignite it.

extending outward for an additional distance. The general concept is illustrated in Fig. 4 and 5.

Integrated zones of this type may have widespread value in foothill areas of Southern California. A tremendous advantage lies in helping to achieve a balance between the effectiveness and the expense of fuel modification. Green belts, as previously stated, are effective in slowing the spread and reducing the intensity of fire, but the cost can be quite high and in many cases might become prohibitive. Low-maintenance zones, on the other hand, are generally less expensive to establish and maintain, but they do not provide the same level of fire protection. By combining the two, it should be possible to achieve a high level of fire protection while, at the same time, holding down the cost. This becomes particularly important when considering the extent of the area around structures that is to be modified. There is growing evidence that safety zones around homes actually should be much wider than the 100 feet usually specified—perhaps in the order of 200-500 feet. Instead of trying to extend the use of green belts, we might more reasonably and at less cost employ low-maintenance zones to supplement the protection afforded by green belts.

Primary responsibility for modifying the vegetation around structures in hillside areas lies with the individual homeowner. But a homeowner with direct control usually over only a small parcel of land is severely limited in the distance away from structures that he can modify for fire hazard reduction. Despite all efforts, he may not be able to construct a safety zone sufficiently wide to provide adequate protection for his home in the event of a large brush fire. The situation is made even worse by the present pattern of hillside development in which homes are interspersed with undeveloped land held by speculators. These undeveloped

areas are often allowed to become overgrown with weeds and brush, thus posing an enormous fire hazard and increasing the danger to nearby homes.

A great deal can be done to help overcome these problems. First of all, a share of the responsibility for living safely in the hills should be placed on developers by requiring that they establish fire protection zones around their housing projects. A related step would be to require absentee landowners to clean up their property to keep the fire hazard at a minimum. Citizen groups of the type organized since the 1961 Bel Air fire have proven to be highly effective in working for legislation to better regulate hillside development and in reducing fire hazards by conducting neighborhood clean-up campaigns and fuel modification programs. In addition to these steps, we ultimately need to consider the possibility of establishing wide "fuel breaks" that wouldseparate entire communities from the wildlands. Zones of this kind would not only serve in fire hazard reduction but also have recreation potential as linear parks (Los Angeles County Forestry Division, personal communication). Golf courses and trails for horseback riding and hiking, for example, would form an integral part of such a fuel break system.

The approaches discussed here to fuel modification around homes can help make living in the hills safer. The most important thing now is to move forward as quickly as possible to effectively apply this knowldege in high fire danger areas. More people each year find themselves faced with the grim realities of fire, flood and mud slides. By understanding the nature of the threat, and following the guidelines set forth here, they can help themselves immeasurably in avoiding the kind of destruction that has been experienced in recent years in Southern California.

Kenneth Montgomery is a biologist on the research staff at the Arboretum with a special interest in plant ecology.

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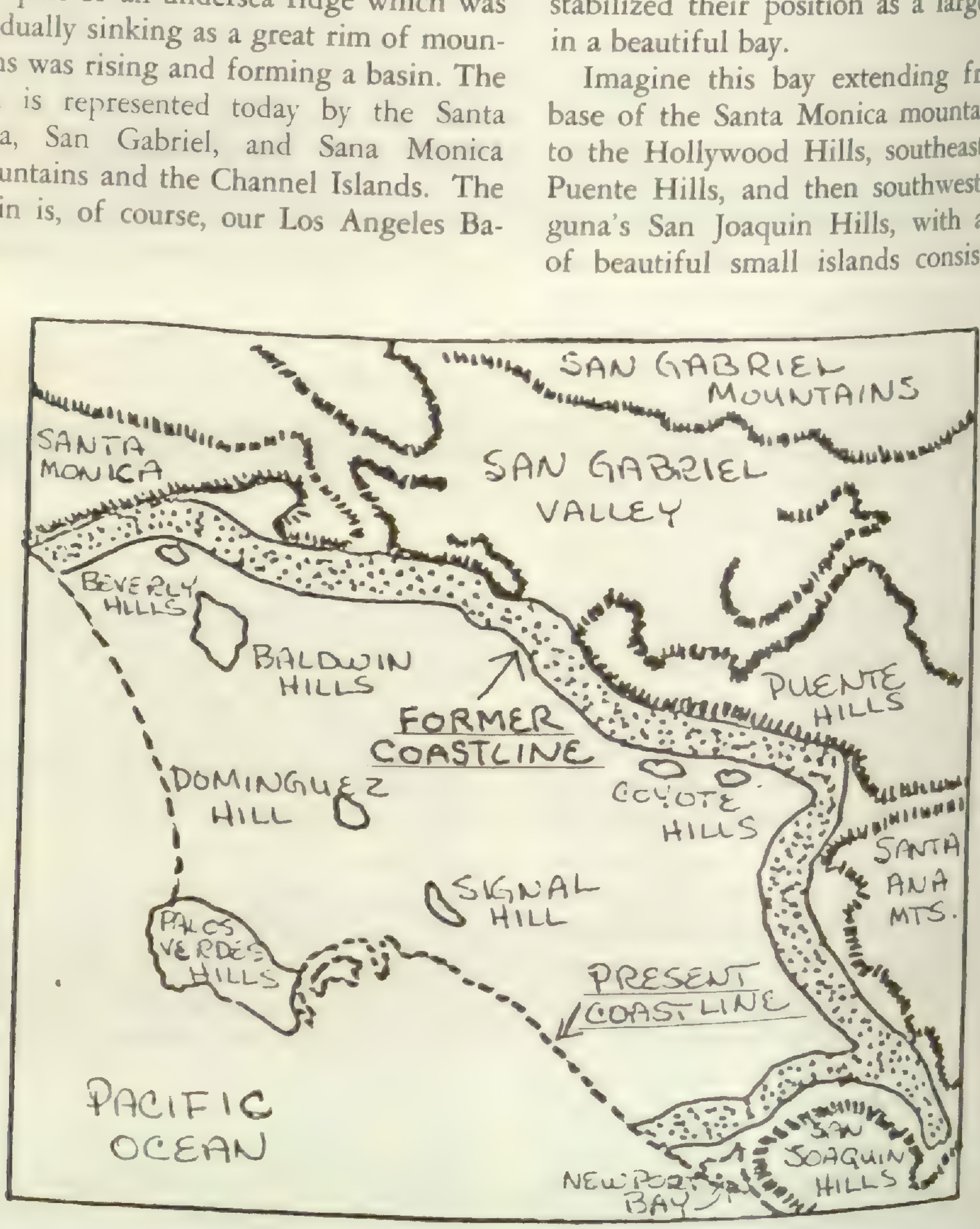
A Landfill Botanic Garden

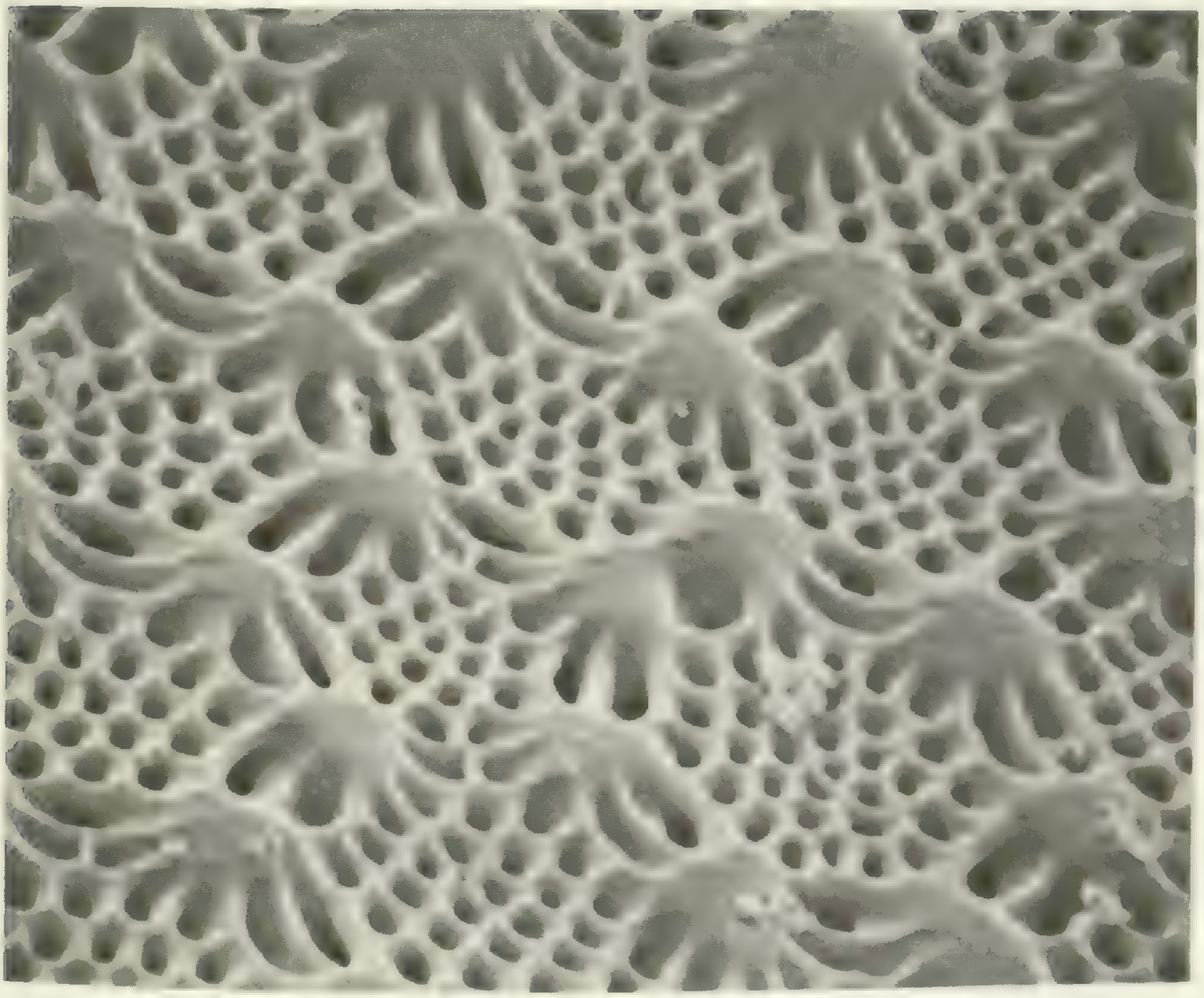
South Coast Botanic Garden is unique in its geological history. Fifteen million years ago the Palos Verdes Peninsula, where the Garden is located, was part of an undersea ridge which was gradually sinking as a great rim of mountains was rising and forming a basin. The rim is represented today by the Santa Ana, San Gabriel, and Sana Monica mountains and the Channel Islands. The basin is, of course, our Los Angeles Basin.

Thirteen million years later, or approximately two million years ago, the Palos Verdes Hills began their emergence from the ocean, and one million years later stabilized their position as a large island in a beautiful bay.

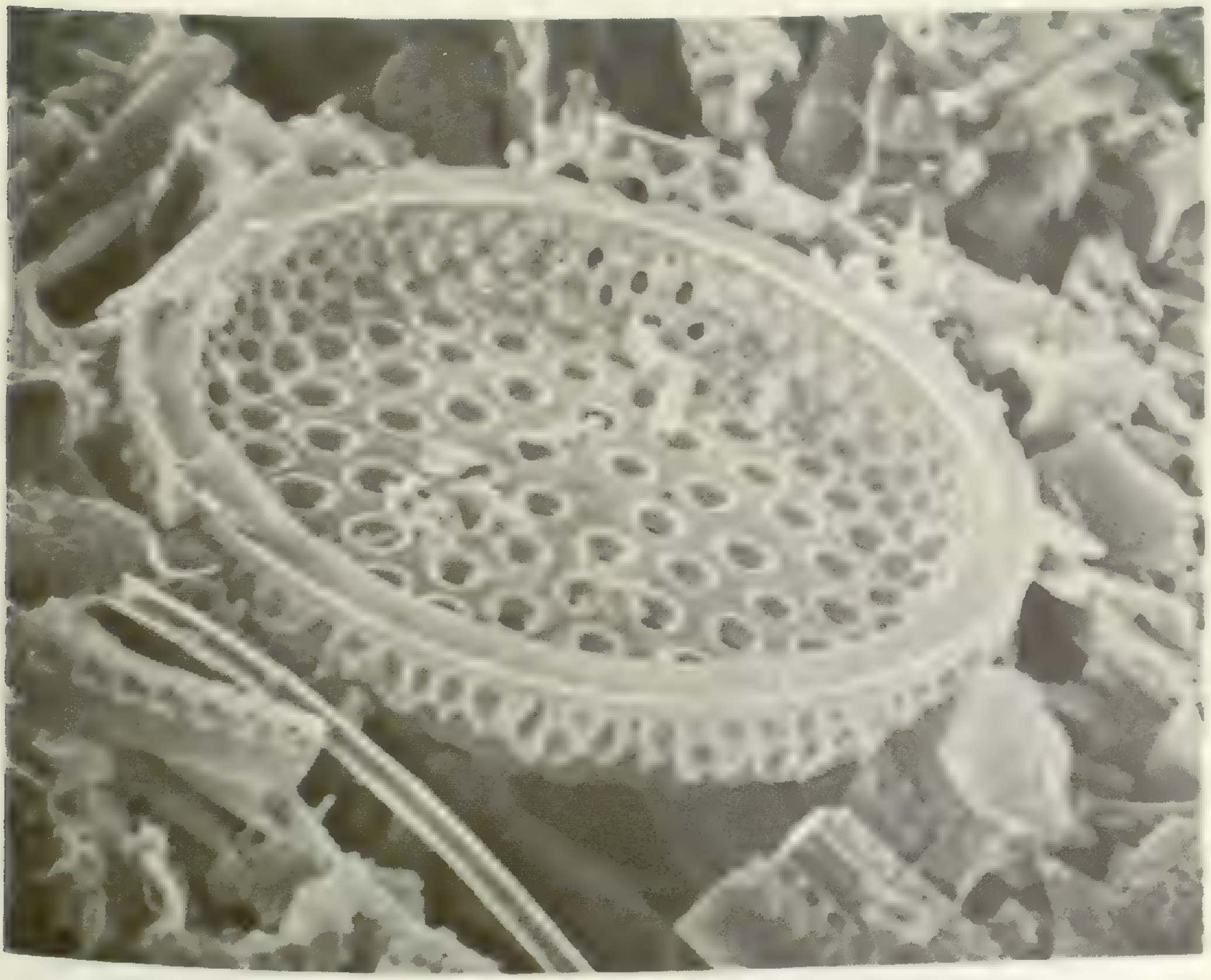
Imagine this bay extending from the base of the Santa Monica mountains east to the Hollywood Hills, southeast to the Puente Hills, and then southwest to Laguna's San Joaquin Hills, with a string of beautiful small islands consisting of



Sketch showing former and present coastline of Palos Verdes Peninsula.



Silicified skeletons of diatoms, magnified (upper) 10,000 times and (lower) 3,500 times.



Photos courtesy of Hi-Rel Laboratories, Inc.

the Palos Verdes Hills, Beverly Hills, Baldwin Hills, Dominguez Hills and lone Signal Hill. The Los Angeles Basin was this beautiful bay until 50,000 years ago; then, as the sea receded, sediment from the northern San Gabriel Mountains filled this gap with rock, gravel, and silt.

The peninsula itself gathered sediment of shales, mudstones, sandstones, and diatomite as it gradually emerged higher and higher in a series of spasms evident today in the terraces of this land area. Silica from volcanic eruptions millions of years before and present in the coastal waters was used by the minute, one-cell diatoms. Diatoms are an algae which make up a very large group of primitive plants that appear to have changed very little during geological times. Algae rarely are colorless and are sometimes considered as the simplest of green plants. They are numerous and widely distributed, primarily aquatic and can be unicellular like the diatoms, or multi-cellular like the seaweeds.

This group of plants manufacture their own food frm inorganic substances and furnish the link between the inorganic and organic compounds by becoming he primary food of all aquatic creatures.

Their possession of chlorophyll enables them to synthesize sugars from carbon and water, and manufacture food. The development and maintenance of aquatic animal life would have been impossible without them.

The great importance of this algal food chain can be further appreciated when we realize that this planet was once a water covered mass. After the development of the one cell plant that was able to manufacture its own food, the aquatic animal life dependent on this food was able to develop. In truth, animal life would be impossible without the simple diatom and its fellow algae.

Diatoms have played a crucial role in the life-cycle food chain of this earth since life began. Their skeletal remains have also proved to be of great industrial importance. These aquatic algae lived and died by the trillions leaving layer upon layer of their silicified shells or skeletons on the ocean floor. After the emergence of the peninsula, these deposits of diatomite sediment resulted in our present day native diatomaceous earth at South Soast Botanic Garden.

Diatomaceous earth plays a significant role in our daily lives, especially in the filtration of liquids. Many familiar commercial products would be economically impossible to produce without diatomite filtration. Examples are sugar, antibiotics, beer, swimming pool filters, and cleaning fluid recovery, all requiring various kinds of clarification and purification in their production. Diatomaceous earth is also used as a filler in the manufacture of paint, pesticide, paper, and asphalt, and of equal importance is its role as a heat-saving insulation material in ovens, kilns and furnaces.

The exceptional heavy deposits of diatomaceous earth were recognized by the Great Lakes Carbon Company which mined this future garden site from 19[illegible] until 1954. The abandoned mine site was purchased in 1956 by the Los Angeles County Sanitation Department. The first load of trash was deposited in 195[illegible] and on February 15, 1965 at 10:30 a.m. the last load was deposited. Three and one half million tons of trash in depths of five to one hundred and sixty five feet rest under this botanic garden today, but because of the careful contouring of the terrain by the Sanitation Department the visitor is not aware unless informed by the tour guide or helpful volunteer.

This is another in a series of articles by Armand Sarinana, superintendent of South Coast Botanic Garden, describing the origin and development of this garden.

Photo by Francis Ching

An Arboretum is for people . . .

This early-morning view of a spring-fed lagoon at the Los Angeles State and County Arboretum embodies the best meaning of the words ecology and conservation.

The lagoon serves as a haven for resident water birds, as a rest station in an urban area for migratory birds, and as a nesting place within its reed-lined shores for a number of endangered species. In turn, the birds keep the fish population in check, helping to clean the water of algae, and afford pleasure for thousands of visitors, young and old.

The Queen Anne Cottage is a California state historical landmark being preserved for future generations. The Mexican Fan Palms, seen all over Southern California, are the tallest of any in the United States.

SCE

Southern California Edison Company

BOOKSHELF

THE BOOK OF LANDSCAPE DESIGN by H. Stuart Ortloff and Henry B. Raymore; William Morrow & Co., New York.

This book was written for the nonprofessional and as such it generally fulfills its purpose, although it seems somewhat dated, having first been published in 1959 and reissued last January in paperback form. The information presented is excellent, the summary of the history of landscape architecture being particularly concise and complete. I was in agreement with the statements regarding design and composition, but not with all examples given to illustrate these principles. The authors are definitely schooled in the formal school of landscape architecture and tend to relate design principles in that direction. With few exceptions, most chapters of the book seem unnecessarily long, the authors making the same points over and over. It is this repetition that makes the book read like a compilation of the author's talks to garden clubs. Indeed, the book appears to have been written not just to the individual homeowner with guidelines for the landscaping of his home, but for members of garden clubs and the areas of activity that garden clubs might be involved in. In this respect, it is very helpful in dealing with probliems having to do with community ordinances and the like.

The book contains a number of photos and quite a few drawings which, though probably adequate, are not as effective as they might be.

HOW TO PLAN AND PLANT YOUR OWN PROPERTY by Alice Recknagel Ireys, L.A. William Morrow and Co., New York.

A book strictly for the beginner, and on this level very good. The homeowner is led step by step through three divisions of landscaping in a text that is perhaps more descriptive than necessary. The relationship between the many photographs and adjacent plans is excellent. One minor limitation is that the plans and drawings look outdated, as if they were made thirty years ago. A more serious fault is that too many of the pictures and plants are not identified to a region.

Lawrence Reed Moline, A.S.L.A.

Other new acquisitions to LASCA Plant Science Library:

AIR POLLUTION DAMAGE TO VEGETATION, John A. Naegele, ed. American Chemical Society, Washington, D.C. 1973. 137 p. (Advances in chemistry series. 122)

THE BIOCHEMISTRY OF GREEN PLANTS, David W. Krogmann. Prentice-Hall, Englewood Cliffs, N.J. 1973. 239 p.

BIOETHICS: bridge to the future, Van Renssalaer Potter. Prentice-Hall, Englewood Cliffs, N.J. 1971. 205 p.

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THE BIOLOGY AND CHEMISTRY OF THE UMBELLIFERAE, V. H. Heywood, ed. Academic Press, London. 438 p. Illustrations. (Botanical journal of the Linnean Society. Suppl. 1)

BIOLOGY OF HALOPHYTES, Yoav Waisel. Academic Press, New York. 1972. 395 p. Illustrations.

THE BIOLOGY OF MYCOPLASMAS, Paul F. Smith. Academic Press, New York. 1971. 257 p. Illustrations.

CHEMISTRY IN BOTANICAL CLASSIFICATION, Gerd Bendz and Johan Santesson. eds. Academic Press, New York. 1973 320 p.

THE COMMON INSECTS OF NORTH AMERICA, Lester A. Swan and Charles S. Papp. Harper & Row, New York. 1972. 750 p. Back and white and coor illustrations.

THE CONCISE HERBAL ENCYCLOPEDIA. Donald Law. St. Martin's Press, New York. 1973. 266 p. Black and white and color illustrations.

ECOLOGY OF HALOPHYTES, Robert J. Reimold and William H. Queen, eds. Academic Press, New York. 1974. 605 p. Illustrations.

BEAUFORTIA SPARSA (Cover)

Beaufortia sparsa is a heath-like plant indigenous to West Australia that looks somewhat like a bottlebrush *(Callistemon)* to which it is related. It is much more open than most callistemons and the orange-hued flower heads, though similar, are larger.

Botanically, it is an evergreen shrub growing to 8 feet, leaves ovate to elliptic, entire, alternate or sometimes apparently opposite or whorled, crowded, sessile, thick, leathery, and small. The cultural requirements of *Beaufortia sparsa* are also similar to those of the bottlebrush in that it prefers light, well-drained soils, a moderate amount of moisture, and a location in full sun. It is not subject to disease and is apparently free of insect pests. Without shaping or pruning it grows naturally into a relatively well-formed shrub that is higher than it is wide. The orange-red flowers are made up mostly of stamens and appear in many clusters in the late spring. *Beaufortia sparsa* is particularly well suited for use against walls and fences.

The Los Angeles State and County Arboretum will be introducing this plant to the nursery trade in the near future. Interested parties may call the Arboretum superintendent for further information.

ARBORETUM WEATHER

Long. 34d 08′ 48″ N.
Lat. 118d 02′ 59″ W.
Elev. 571.28 ft.

Weather season
Oct. 1 to Sept. 30

	November	December	January
Average daily maximum temperature	72.4	67.2	68.4
Average daily minimum temperature	41.0	44.4	42.4
Highest temperature	91	80	86
Lowest temperature	42	33	32
Number of clear days	19	25	24
Number of partly cloudy days	8	5	4
Rain during this month	.06	1.01	.19
Total rain since Jan. 1st	1.01	5.36	5.55

Calendar

April, May, June

ARBORETUM, Arcadia

April 5 — 6 to 8 p.m.
Preview, Baldwin Bonanza
Members of California Arboretum Foundation and guests

April 6 — 8 to 5 p.m.
Baldwin Bonanza—5th Annual
Presented by California Arboretum Foundation

April 13 — 2 p.m.
Sunday Afternoon Lecture*
"Poisonous and Medicinal Plants"
Dr Leonid Enari, senior biologist

April 19, 20 — Sat. 1 to 5 p.m.
Sun. 9 to 5 p.m.
Iris Show*
Presented by Southern California Iris Society

April 26, 27 — 8 to 5 p.m.
Amaryllis Show*
Presented by the Southern California Hemerocallis and Amaryllis Society

May 4 — 10 a.m.
Sunday Morning Walk*
"Lawns and Ground Covers"
Charles Lee, horticultural consultant

May 3, 4 — Sat. 1 to 5 p.m.
Sun. 9 to 5 p.m.
Rose Show*
Presented by the Pacific Rose Society

May 10, 11 — 8 to 5 p.m.
Epiphyllum Show*
Presented by the Epiphyllum Society of America

May 17, 18 — 8 to 5 p.m.
Spring Extravaganza
Presented by the California Arboretum Foundation

May 24-26 — 8 to 5 p.m.
Bonsai Show*
Presented by the Santa Anita Bonsai Society

June 1 — 10 a.m.
Sunday Morning Walk*
"Greenhouses"
Tim Lorman, horticulturist

June 21, 22 — 8 to 5:30 p.m.
Gladiolus Show*
Presented by the Southern California Gladiolas Society

*Sponsored by California Arboretum Foundation

DESCANSO GARDENS, La Canada

April 11 — 8 p.m.
Theodore Payne Foundation Lecture
"California Wild Flower and Their Uses"
Mrs Merri Barsch, photographic hobbyist

June 1 — 9 to 5:30 p.m.
Annual Art Festival
Presented by Descanso Gardens Guild

June 8 — 10 to 4:30 p.m.
Hemerocallis Show*
Presented by Hemerocallis Society of Calif

June 8 — 10 a.m.
Sunday Morning Walk*
"Roses and Annual Flower Beds"
George Lewis, superintendent

*Sponsored by Descanso Gardens Guild

SOUTH COAST BOTANIC GARDEN, Palos Verdes Peninsula

April 4 — 8 p.m.
Theodore Payne Foundation Lecture*
"Your National Forest"
William T. Dresser, Forest superintendent, Angeles National Forest

May 10, 11 — 8 to 5 p.m.
Fiesta de Flores
Presented by South Coast Botanic Garden Foundation

May 24-26 — Sat. noon to 5 p.m.
Sun 10 to 5 p.m.
Mon 10 to 4 p.m.
Cactus and Succulent Show*
Presented by South Coast Cactus and Succulent Society

May 25 — 2 p.m.
Sunday Afternoon Lecture*
"Lawns and Ground Covers"
Armand Sarinana, superintendent

June 8 — 10 a.m.
Sunday Morning Walk*
"Flowering Plants"
Armand Sarinana, superintendent

*Sponsored by South Coast Botanic Garden Foundation

BIRDWALKS

ARBORETUM
1st Sunday of each month at 8 a.m.

DESCANSO
2nd and 4th Sunday of each month at 8 a.m.
Sponsored by San Fernando Audubon Society

SOUTH COAST BOTANIC GARDEN
3rd Wednesday of each month at 8 a.m.
Sponsored by South Coast Botanic Garden Foundation

June
1975
Vol. XXV
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Itasca Leaves

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Editor
Donald S. Dimond

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department notes

ADMINISTRATIVE CENTER

GROUND-BREAKING ceremonies were held at South Coast Botanic Garden last May 21 marking the start of construction of two one-story buildings that will house the long-awaited Administrative Center. County Supervisor James Hayes, in whose district the garden is located, Dr. Paul Saffo, president of the South Coast Botanic Garden Foundation, Mrs. Mary Bittner, president of the department's Board of Governors, and Francis Ching, department director, were the speakers at the event which started at 9:30 on a clear, crisp morning. After welcoming remarks to the people gathered at the building site, among them Alice Quiros of the South Bay Bromeliad Association, Jerry Curtis of the South Bay Herb Society, and other longtime supporters of the garden, Mr. Ching began his introduction of the notables present by recognizing a lady who, he observed, needed no introduction—Mrs. Frances Young, remembered by everyone for her many contributions to the garden since she first helped to bring it into existence. In a similar category was Don Woolley, superintendent from 1962 to 1971. Others introduced were Ove Hover, Ed Harrison and Merrill Cate, members of the Board of Governors; Cleona Crozier, Helen Pickett, Cliff Graham, and Eugene Hillman, officers of the Foundation; Mrs. Thomas Heinsheimer, wife of the mayor of Rolling Hills; Don Hendrickson, chief architect for the project.

South Coast Botanic Garden Administrative Center

From left: Dr. Paul Saffo, president of the South Coast Botanic Garden Foundation; Francis Ching, department director; and Supervisor James Hayes on the building site which once looked like the landfill operation seen in the distance.

From left: Ove Hoyer, Frances Young, Supervisor Hayes, Mary Bittner, Ed Harrison, Don Hendrickson, Francis Ching, Hiam Barmack, and Merrill Cate.

From left: Department Director Francis Ching with Supervisor James Hayes receiving $20,000 check from Foundation President Paul Saffo.

Ground-breaking day, May 21, 1975. "We were there!"

and, finally, Dr. Saffo, Mrs. Bittner, and Supervisor Hayes. In his remarks, Supervisor Hayes noted how important it is for a community to inform its political representatives of its needs, pointing out that in the light of a proposed drastic cut in the county budget citizens must give the Department forceful support. He said this kind of community action is necessary even though there is a recognized need for arboreta and botanic gardens in every urban area in which green and open space is threatened by excessive development.

The ceremonies represented the happy culmination of nine years of planning and hoping. To help pay for the project, the South Coast Botanic Garden Foundation is contributing $20,000 to the county immediately and has pledged an additional $200,000 over the next five years. The design by Hendrickson and Knox, a Palos Verdes Estates architectural firm, calls for connecting the two buildings by a common courtyard, one building providing office space for the superintendent and receptionist, a general office for research and education, a seminar room, and space for a reading room. The other building will consist mainly of an auditorium of 7,000 square feet, of which 2,000 square feet can be converted to two classrooms by means of folding walls. The plans also provide for parking for 240 cars, a tram-loading area, a road connecting the new facilities to the existing road system, and a new main entrance off Crenshaw Boulevard.

ANNUAL MEETING

THE annual membership meeting of the California Arboretum Foundation on May 29 was attended by 400 members and their guests who in about two and a half hours, starting at 5 p.m., enjoyed tram tours of the grounds, a twilight picnic buffet, a brisk business meeting, a sneak preview of the Prehistoric and Jungle Garden, and the membership plant distribution, consisting this year of two melaleucas introduced by the Arboretum, one a large shrub with crimson flowers *(M. elliptica)*, the other a medium-sized tree with showy white flowers *(M. linariifolia)*.

The buffet and meeting were held in a corner of the Arboretum's Mediterranean Section so that everyone had only to walk across the road when it came time to see the Prehistoric and Jungle Garden. Still under development, this new project received enthusiastic praise, particularly the just-completed viewing and display deck.

Mrs. John Grivich, Foundation president, presided over the meeting, which she opened with a warm welcome to her guests, Mrs. Mary Bittner and Mrs. Marilyn Stokes, president and member, respectively, of the Board of Governors, and Mrs. Rodney Rood, president of the Descanso Gardens Guild. The meeting continued with the traditionl financial report, the nomination and election of new trustees, and remarks from Francis Ching, director, and then was adjourned for the preview of the new garden.

DESCANSO GARDENS SPEAKER

THE DESCANSO GARDENS GUILD has announced the availability of a new spokesman for the gardens. She is Mrs. Edith Sawyer, a ten-year member of the Guild whose interest in the gardens has led her into lecturing. Mrs. Sawyer's presentation covers all aspects of Descanso Gardens, including its activities and historical background, and is highlighted by the showing of color slides. Program chairmen for interested organizations can arrange for a speaking date by calling the Guild office at 790-5414. There is no charge for Mrs. Sawyer's services but donations to the Descanso Gardens Memorial Fund are welcomed.

The plant sale was one of the busiest events of the Fiesta.

FIESTA DE FLORES

THERE IS evidence everywhere of the growth of South Coast Botanic Garden, but nowhere more basically expressed than in attendance which increases week by week and event by event. A case in point is the 13th Annual Fiesta de Flores, held last May 10 and 11. Always the major event of the year at South Coast, this past Fiesta attracted 5,700 visitors, a thousand more than last year. Great credit is due the South Coast Botanic Garden Foundation whose members organized and carried off a varied program that delighted everyone. Their program was a happy balance of entertainment in the form of singing groups and instrumentalists; horticultural lectures and demonstrations — vegetable gardening, bonsai, herbs; plant exhibits of all kinds and plant sales. They were given an assist by two days of sparkling weather and a garden that never looked lovelier with colorful ground covers, flowering trees and the clear, newly-filled lake.

Visitors pause to view the bromeliad display.

Suspended on eucalyptus lodgepoles, the Arboretum's Prehistoric Garden redwood-and-fir viewing-deck commands views of the Queen Anne Cottage and Hugo Reid Adobe across the lagoon and, to the north, the as yet uncompleted cycad collection. Within the deck space are redwood display cases containing graphic descriptions of the evolution of plants.

Vieuing deck in Prehistoric and Jungle Garden at Arboretum.

Begonia house at the Arboretum.

The Begonia House at the Arboretum was recently relandscaped under the direction of Tim Lorman, horticulturist. A curved, crushed white-rock path bordered by sections of railroad ties was constructed and the plants were terraced so as to afford visitors a better view of the 80 begonia species and 200 varieties represented in the collection.

This 6,000-square-foot shade area at the Arboretum was built to provide cover for outdoor events. It is designed so that the saran-covering can be put up or taken down easily and quickly according to the weather and the requirements of the event.

HOWARD MILLER

HOWARD A. MILLER, one of the original signers in 1948 of the articles incorporating the California Arboretum Foundation, died after a brief illness in Huntington-Memorial Hospital in San Marino on April 28. Mr. Miller, a resident of San Marino for 38 years, will be remembered for his many years of service on behalf of the Arboretum. He was a member of the Board of Trustees of the Foundation from its inception until his death, serving as treasurer until five years ago when he became an honorary member. He was also a member of the Board of Governors of the Department, serving from July 1, 1953 to June 30, 1974. Mr. Miller belonged with that group of persevering pioneers led by Dr. Samuel Ayres, Jr., who ultimately were to persuade the Board of Supervisors that Los Angeles County should have an arboretum. Perhaps because of his considerable experience in civic affairs—Mr. Miller was the founding director of the Los Angeles Junior Chamber of Commerce, and had been director of the Metropolitan Water District and assistant manager of the Los Angeles Chamber of Commerce—he was selected to make the presentation to the Board. It was a wise selection, for Mr. Miller impressed the supervisors with the desirability of the project, leading those gentlemen to lend their weight to subsequent negotiations that made the Arboretum a state and county institution.

AWARD TO RUSSELL J. SEIBERT

LONGTIME friends and associates of the Arboretum will be happy to learn that Dr. Russell J. Seibert, director of the Los Angeles State and County Arboretum from 1950 to 1955, was recently named the winner of one of the most prestigious awards in American horticulture—the Arthur Hoyt Scott Garden and Horticulture Award.

Dr. Seibert was honored for developing Longwood Gardens in Kennett Square, Pennsylvania, from a private estate into an outstanding public display garden known for its cooperative plant exploration ventures with the U.S. Department of Agriculture. He was also recognized for his introduction of a number of new plants from Peru and other parts of the world. Dr. Seibert has been the director of Longwood Gardens since leaving the Arboretum.

The award, in the form of a specially designed gold medal and a check for $1,000, was presented last month by Dr. Theodore Friend, president of Swarthmore College, at the annual Spring Garden Festival of the Scott Associates on the Swarthmore campus.

PLANT PORTRAITS

Ginkgo

Leonid Enari

THE EXISTENCE of the ginkgo or maidenhair tree (*Ginkgo biloba*) can be traced back at least to the Jurassic, a time when the Sierra Nevada and its gold was born, when the dinosaurs had problems of overpopulation, and when birds and mammals were about to start their climb up the ladder of evolution. The Jurassic is the geological period which began 180 million years ago and lasted 50 million years.

From the Jurassic on, the ginkgo spread over the Northern Hemisphere. Its fossil remains, mostly leaves, have been found in Greenland, Europe, Asia, and North America. Then, in the beginning of the Quaternary, 3-1/2 million years ago, a dramatic change took place in the earth's climate. Cold crippled the world, glaciers formed in the North, and the Ice Age made its appearance. As the ice cover moved southward, it destroyed the northern forests and swept all life before it into the South. The ginkgo trees dwindled in number and perished. Only in eastern Asia, where the destructive ice halted its southward progression, was the ginkgo able to survive.

The last refuge of the ginkgo was discovered in 1916 by Frank Meyer, botanical explorer of the U. S. Department of Agriculture, who came to a ginkgo forest near Changhua Hsien, about seventy miles west of Hangchow in the Chekiang province of China. The trees there were so common they were cut for firewood. The area visited by Meyer lies in the western part of the Tien Mu Shan range, along the northwestern border of Chekiang and southwestern Anhwei, where the early Chinese records place the original home of the ginkgo. In the twenties and thirties this area was visited by several Chinese botanists who collaborated with Meyer.

The ginkgo is a large tree known to reach a height of more than 100 feet.

Its leaves are fan-shaped, smooth, long-stalked, leathery, bright green when young, dull green at maturity, turn a beautiful yellow in the fall before falling, and measure, usually, from 2 to 3 inches across. They are used in China and Japan

Ginkgo biloba at the Arboretum

Flowers of male ginkgo, left, contrasted with female flowers, right.

as bookmarks and are supposed to keep silverfish and larvae of other insects away from books.

The flowers, appearing before the leaves are fully developed in the spring, are of two kinds, male and female, and they occur on short shoots of different trees. The male or pollinating flowers are in arching catkins resembling those of the oak, but stouter and less pendulous. The female or fruit-bearing flowers, usually in pairs, are borne under small expanded knobs on long stalks.

The fruits, or more properly seeds, are plum-like, orange-yellow in color and about an inch in diameter. A thin outer layer covers an oval, pointed nut with a smooth, white shell enclosing a soft kernel. Soon after falling on the ground, the fleshy covering bursts and emits a most offensive odor comparable to some varieties of cheeses. When the nuts have been cleaned of the offensive pulp and washed, they are pure white. They are sold for food in China and Japan and are eaten at banquets, weddings and social gatherings.

The wood is white or yellowish-white in color, light in weight, fine-textured, soft, weak, easy to work, and has insect-repellant properties. It is of good quality, but little used because of its very limited supply, even in China.

The ginkgo is a long-lived tree, reaching an age of 1,000 years and even more. Magnificent old specimens are found in China, Japan, and Korea where they usually are planted on the grounds of temples, religious shrines, and palaces. Very old trees often develop burs which resemble stalactites. These burs are due to abnormal development of dormant or

adventitious buds. If they reach the ground, they take root and bear leaves. This phenomenon has not yet been observed on any tree in America. However, there are reports on these bur-like growths on several trees in Europe.

It is believed that a tree growing near the city of Sendai in Japan is the one that was planted on the grave of Naihaku-Kojo, a Buddhist priestess, in the period of Tempoyo, 700 A.D., when Buddhism was established by Emperor Shome in Japan. According to the story, Naihaku-Kojo, an aunt of the emperor and wet nurse of the emperor's children, asked permission from the emperor to become a priestess. Her request was granted, and from that time on she dedicated herself to work and pray for the happiness of the country and the people. Once, when talking with another priest, she remarked that she had been greatly honored in being the nurse of the emperor, but now, being eighty years old, she might at any time be called to heaven. It was her will that a ginkgo tree be planted on her grave instead of a monument so that her soul could live in the tree forever and devote itself to prayer for nurses. When she passed away and was buried in a place near the temple, her directions were followed. Year after year the tree thrived, and after a time pendant growths like breasts began to hang down from its branches. The people called it the nurse tree, and since Naihaku-Kojo's conversation with the other priest was widely known and touched the heart of the people, they came to worship the tree as the goddess of nurses. And even now, after 1,200 years have passed, thousands of people still visit the tree and worship there.

The first incidence of cultivation of the ginkgo outside of its natural range was recorded in Chinese literature in the eleventh century when a few trees were planted at Kaifeng, the capital, by Prince Li Wen-ho. The trees were named Ya Chio, meaning duck's foot, referring to the shape of the leaves.

Europe first learned of the ginkgo from the German physician, Engelbert Kaempfer, who came across it during his travels in Japan and first described it in 1712. The name should have been Ginkyo according to the original Japanese spelling, but Kaempfer's version was adopted by Linnaeus, and has since been retained by all botanists.

According to records, the tree was first introduced to the United States by William Hamilton, who planted a ginkgo in 1784 in what is now Woodlands Cemetery, West Philadelphia. This tree died about 1955. Just when the ginkgo appeared in California is not known. It was probably around 1849, when the first nurserymen began to arrive in California from the East. According to a report John Sutter had a ginkgo tree growing on his place near Sacramento in 1859.

At the Los Angeles State and County Arboretum ginkgoes are found in quadrant N-9 where they are more or less grouped around the Coach Barn. The specimen on the road between the Barn and the Herb Garden is believed to have been planted by E. J. Baldwin in the 1880's. It is approximately 93 feet high. They are also planted at Descanso Gardens in La Canada, and the South Coast Botanic Gardens on Palos Verdes Peninsula.

Ginkgoes are used as specimen and as street trees. Because of their distinctive appearance and picturesque effect, and their potentially great size, they are particularly valuable for solitary planting in parks or large estates. As a street tree the ginkgo is tolerant of congested situations and contaminated atmosphere.

The author is much indebted to Miss Patty Lawson, a member of the Arboretum's Las Voluntarias, for the drawings that accompany this article.

Living off the land:

The Gabrielinos

Sandy Snider

THE STORY of the Arboretum has many chapters, and to miss even one is to deny yourself a rare opportunity for growth and pleasure. Naturalists, horticulturists, home gardeners, birders, and even history buffs are pleasantly surprised when they discover the rich historical preserve that has survived amidst the natural beauties of the Arboretum.

The historical chapter of the Arboretum actually began thousands of years ago when the last Ice Age forced large game animals across the land bridge that then existed in the area of the Bering Straits. Trailing now-extinct bison, mountain sheep, and mastodons, primitive man entered North America in present-day Alaska and proceeded south through the ice-free passages in search of his dinner.

Age-long migrations across the new continent resulted in the development of some three hundred distinct dialects, arranged for later convenience into eight major language families. Of these eight families, all but the late-arriving Eskimo were represented in California. Arriving from the East about 1000-500 B. C., the Shoshonean language family drove a huge wedge between the tribes of the already-settled Hokan family (Yumans in the San Diego area and Chumash in Santa Barbara) as they settled in the Los Angeles Basin and initiated chapter one of the Arboretum's historical development.

The coastal Shoshonean tribes were named for the Spanish mission responsible for their conversion, hence the appellations Fernandeno, Luiseno, Juaneno, and Gabrielino. The Indians of the San Gabriel Mission encompassed an area bordered by Malibu on the north, Laguna on the south, and the Sierra Nevada on the east, plus the islands of San Clemente and Santa Catalina.

Nature, however, not the eighteenth century Spanish mission, dictated original village sites. Running through the Arboretum is the Raymond Fault, the factor responsible for bringing underground waters in the area to the surface. Near the spring-fed lake (possibly on Tallac Knoll) was the Gabrielino village called Aleupkig-na.

This typical Gabrielino village would probably have included some fifty to one hundred and fifty stocky, well-fleshed inhabitants, brown-skinned, dark-haired, naked except for the women's bark and twine aprons. Both men and women beautified themselves with facial tattoos—the skin was pricked with a thorn, and charcoal from the yucca cabbage or juice from nightshade leaves was rubbed into the bleeding wounds to produce a strong blue-black tattoo. Ornaments of various kinds were also popular –bird beaks, animal teeth, soapstone beads, pine nuts, and particularly sea shells were strung and worn as beads or worked into the women's fringed skirts.

The Gabrielinos, like other early California Indian tribes, led a fairly primitive existence compared to the high culture of neighboring Aztecs and Mayas in Mexico and Pueblo Indians in the South-

California Indians boiled water in a basket by putting hot rocks in the bottom. Baskets were woven so tightly water could not leak out.

The Indians used willow shoots for the frames of their wickiups and then wove tule grass in and out for the cover. An entire family lived, ate, and cooked in a wickiup, each year building a new one which they completed in a day or two.

Wickiups in which the San Gabrielino Indians lived are today a favorite stopping place of youngsters on school field trips.

west. Almost every facet of their culture reflected a minimum of exertion in response to a lazy, agreeable climate. The details of their day-to-day life form a striking picture of primitive man in relation to his environment.

Gabrielino Indians lived off the land, constantly hunting and gathering life's essentials, in an age when nature provided food, dress, shelter, utensils, and even entertainment. A day in the life of a typical Gabrielino began with a predawn bath in the closest spring and perhaps a hair cleaning application of mud that was dried and chipped off to remove excess oil, dirt, and "critters." A brush wickiup, constructed of staked willow poles bent toward the center and tied, then covered with layers of woven tule reed mats, was home to a Gabrielino family. In these shelters the family warmed themselves over a small fire and slept in relative comfort on animal skin or woven fiber mats. A too-dirty wickiup was simply burned and a new one constructed in a few hours time.

In this hunting and gathering society, men were hunters and women were gatherers, grinders, preservers, cookers, sewers, weavers, and childbearers. Every small and large animal in the valley was hunted—deer, rabbits, rats, squirrels, gophers, antelope, skunks, fish, birds, even insects if food was scarce. Roasted grasshopper could be an epicurean delight.

Before going out on a hunt, men stung their bodies, especially the eyelids, with nettles as a ritual reminder of courage. Handmade bows of juniper, elder, or laurel backed with glued-on strips of deer sinew (glue was made from deer hooves) and cane or bamboo arrows steamed straight by running the moistened shafts over a hot, grooved rock, comprised the hunter's basic weapon. Curved rabbit sticks, clubs, snares, and trap pits were equally lethal, while large nets served to capture numbers of small animals frightened out of hiding by groups of hunters "beating the bushes." Meat and fish were either roasted over the fire and eaten immediately or dried in the sun and wind

and stored for future use. Salt was appreciated, and skins were often traded to Indians at Redondo to acquire the prized commodity.

To the women fell the endless job of gathering—roots, nuts, berries, seeds, and fruits of all types were systematically gathered, ground, and stored. The autumn acorn crop provided the year-round staple of the Gabrielino diet. With large carrying baskets strapped on their backs, women gathered pounds of acorns which were dried, cracked open with stones, pounded into meal with mortar and pestle, leached in a leaf-lined sand filter to remove the poisonous tannin, and, at long last, cooked into a soup or baked into a hard, blackened bread. Chia, cherry, cattail, sunflower, grass, and other seeds were similarly ground into meal for use in soups, white bulbs, yucca buds, tule potatoes, plant stems, and pine cones (they popped open when roasted and the pine nuts were shaken out) among other things were roasted in pit ovens lined with leaves and hot stones to form a sort of steam cooker. California was a land of plenty in which an abundant, year-round food supply precluded the necessity of organized agriculture.

The Gabrielino woman, as sewer and weaver, made use of yucca, agave, and other plant fibers. Rubbed on the thigh to make twine and cordage, agave fiber was used in making fishing and hunting nets, baskets, mats, sandals, straps, even hairbrushes, while the sharp agave spine made a perfect needle with its fiber thread already attached. Reeds, roots, and plant fibers were both twined (soft root strips were woven in and out between stiff ribs) and coiled (a fiber or reed was wound around other reeds to form a rope which was then coiled into a circular pattern and sewn together) to fashion multiple purpose baskets. Cone-shaped baskets were used to carry in the acorn crop, while the gatherer's forehead was protected from the strap of the carrying net by a basket cap. Handmade baskets served as sifters, seed-beaters, winnowers, storage containers, and even watertight cooking vessels. With a looped stick, hot stones were placed in the boiling basket and stirred carefully to heat the acorn soup without burning a hole through the flammable material. The boiling basket then metamorphised into a communal pot in which all members of the family dipped their fingers.

Into every such "hand-to-mouth" existence a few germs must fall, but the Gabrielinos were ready for almost any illness. Pinyon resin could be chewed to relieve a sore throat or be applied hot as a dressing for sores, cuts, and insect bites. A tea made from buckwheat stems and leaves eased bladder troubles, while white alder bark tea helped check diarrhea caused by drinking bad water. Manzanita seed-lotion worked wonders on poison oak inflammation, while juice from poison oak stems, leaves, and roots was used as a cure for warts and ringworm.

In a sense, it was ironic that these people who had lived off the land for so many years, who had adapted successfully to the many whims of nature, should be struck down so quickly by the "blessings" of civilization. Nature had no cure for the white man's smallpox, measles, and syphilis, no answers when mission cattle and crops competed with native plants and drove game animals into the mountains. Become Spanish or die was the ultimate choice. Of the 5,000 Gabrielinos reported in a 1770 estimate, only a handful survived through the nineteenth century. The last full-blooded Gabrielino died about fifty years ago, and the tribe is now officially considered extinct.

Sandy Snider is an assistant in the historical section currently engaged in a research project on the life and times of the Gabrielino Indians.

Growing Paphiopedilum Orchids Outdoors

Earl Ross

THE orchid family is a large one, comprising over 500 genera, at least fifty times as many species, and countless hybrids. They grow in many different parts of the world, at high altitudes and low, in shade and sunlight, and are basically either epiphytic or terrestrial. The best known and the most popular are the epiphytic cattleyas which are essentially greenhouse plants outside of tropical America. Less difficult for the home gardener to grow are the paphiopedilum or

Paphiopedilum orchids at the Arboretum.

lady-slipper orchids, terrestrial plants that can be grown outdoors in Southern California with proper care. There are two types, one with solid green leaves found at high altitudes and the most suitable for outdoor growing, the second with mottled green leaves found at lower altitudes and in warmer climates. Both require abundant rainfall and grow on an accumulation of decaying vegetation on ledges partially shaded by overhanging cliffs or trees. Paphiopedilums have a broad color spectrum that ranges from whites through greens and mahoganies. Many have petals that are striped, spotted, or splashed. The most common color in modern hybrids is probably in the mahogany shade. The rarest would be pink.

Cultural requirements for growing paphiopedilum orchids outdoors in Southern California are as follows:

Light —

1. Shade throughout the year, more in summer than winter.
2. About 10% to 15% of direct light from the sun should be adequate.
3. The foliage should remain dark green throughout the year.

Temperature —

1. Optimum growing temperature is 54° at night and 75° day.
2. Plants can tolerate temperatures of 28° for short periods of time.
3. Place plant in protected area if temperature is anticipated to drop below 28°.

Humidity —

1. Mist over plants daily, before noon if possible.
2. Excessive moisture on leaves late in day encourages disease.
3. Keep plants at ground level and away from dry breeze.

Watering —

1. Potting medium should never dry out.
2. In summer water about three times per week.
3. In winter water infrequently but as often as plant requires.

Feeding —

1. Feed plants with weak solution of a complete fertilizer such as liquid 30-10-10. Apply according to directions on label. The 30-10-10 refers, of course, to the three primary nutrient elements: nitrogen, phosphorus, and potassium, always listed in that order on fertilizer labels so that gardeners know immediately the ratio of these prime nutrients in the product they buy—in this case, 30 parts of nitrogen, 10 parts of phosphorus, and 10 parts of potassium. The reason for the high nitrogen content for paphiopedilums is to satisfy the needs of both the plant and the bacteria that breaks down the potting media which is mainly fir bark.

Potting —

1. Pot soon after flowering if compost has decomposed or if plant is crowded.
2. Compost should be loose and well drained, such as two parts redwood bark and one part sponge rock, and four parts fir bark, all fine grades

(The home gardener will find it more convenient to buy this compost ready-mixed, rather than buying the parts separately and mixing it himself.)

3. Divide plants to not less than three growths. Larger plants flower better.
4. Remove all dead leaves, dead roots, and all old compost.
5. When selecting a pot for the plant, allow space for two new growths to edge of pot. Plastic pots are superior to clay pots because plastic does not dry out as rapidly as clay and salts from water and fertilizer do not build up as rapidly as in clay pots.
6. Place base of plant about one half inch below top of compost. If the plant is set too deep, the base may rot.

Location —

1. Lath house, under trees, in raised beds or on north side of house.
2. Leave plants in pots and sink pots in ground, leaving rim of pot exposed.
3. Place pea gravel under pot for drainage.

Flowering —

1. Plants start flowering in early December and can be in flower as late as the end of June, depending on the number and selection of plants one wishes to maintain.
2. Flowers are borne singly on a single stem, or on spikes with multiple flowers, as in the *P. glaucophyllum* group. Spikes form one or two flowers at a time which can last 3 to 4 weeks; the spikes continue to produce flowers for about 4 months.

Pests —

1. Plants are relatively pest free.
2. Slugs and snails should be controlled with a granular metaldehyde bait.
3. Mealybugs and scale can be controlled with malathion sprays.

Propagation: Because of their pouches, laymen commonly think of paphiopedilums as being insectivorous plants. They are not, although the pouch is a trap. What it does is trap an insect which, in order to get out, has to crawl up the back side of the pouch using the fine hairs as a ladder. In so doing, the insect picks up pollen which it then transfers to other plants, thereby assuring cross pollination. In nature, propagation is mainly through wind-blown seed. A paphiopedilum pod can contain as many as 100,000 seeds, which are about the size of dust. When the capsule splits, the seeds are carried for some distance. If they are lucky enough to fall in the right spot where there is enough moisture and food, germination will take place. After germinating, it will be a long hard life of as much as twelve years before the first flowering.

For the home gardener, it is impractical, although not impossible, to start with seed. The best way to obtain plants would be through a specialty nursery. A strong plant in flower can be the best buy; it will flower yearly and you will know at the time of purchase the exact quality of the flower. Seedlings, though less expensive, will take more care and a longer time to flower depending on their size when purchased.

Earl Ross has been the orchidist at the Arboretum for the past seven years.

A Landfill Botanic Garden

Armand Sarinana

THE AREA along the northern border of the Palos Verdes Hills was once one of the richest sources of diatomaceous earth in California, yielding more than a million tons between 1929 and 1954. When the marketable supply became exhausted after a quarter of a century of mining, the companies involved followed the standard practice of mining companies everywhere—they simply left, leaving gaping, unfilled holes in the ground. The last to leave was the Great Lakes Carbon Company, which mined the area now occupied by South Coast Botanic Garden.

The first commercial mining of diatomaceous earth in the Palos Verdes area was started in 1929 by the Decalite Company, using mules and wagons to remove the deposits. The Decalite Company became the second in the world to manufacture a full line of diatomaceous earth products on a commercial basis.

The principal use of diatomite over the years has been in the filtering of liquids. Two modern uses are in the manufacture of beer and swimming pool filters. But long before it was put to any industrial use it was used as a white body paint by the native Gabrielino Indians who are also said to have used the material as a trade item with nearby tribes, notably the Catalina Island Indians.

In 1956, two years after the Great Lakes Carbon Company had left, the Los Angeles County Sanitation Districts purchased the site for a sanitary landfill, having been attracted by the vacated, unfilled mines.

The Sanitation Districts' main concern is how to dispose of the waste products of our affluent and growing society. It is a concern that led to the use of sanitary landfills as a means of minimizing air pollution. By the end of World War II the amount of smog in the Los Angeles Basin had increased enough to make it both a problem and an object of study. The entire county was designated an Air Pollution Control District for the purpose of investigation and abatement of smog.

Studies soon disclosed that the home incinerator, of which Los Angeles County had the greatest concentration in the United States, was a major contribution to air contaminants. Elimination of this smog-producing factor was turned over to the Sanitation Districts who were charged with developing a comprehensive plan for collecting and disposing of combustible rubbish with minimal air pollution and without interfering with private collectors or with private disposal sites.

Their studies resulted in the purchase of potential sanitary landfill sites, of which the former mine site in Palos Verdes was one of the first. The acquisition of the unsightly, abandoned mining area was opposed by the local residents, understandably fearful of having a gar-

This picture of the Dicalite Company diatomaceous earth-mine on the present site of South Coast Botanic Garden was taken nearly half a century ago.

Pre-garden days.

View of the newly-completed fill area (light area) in 1965, ready for garden use. The Pacific Ocean is seen in the distance. In foreground, section of garden developed since 1960.

bage dump in their neighborhood. After many meetings, discussions, and disagreements, the plan was approved with the proviso that the filled area had to be developed as a regional park or golf course. The decision to convert this particular 87-acre parcel into a botanic garden came on March 1, 1960, when the Board of Supervisors approved the recommendation of citizen and government groups.

The Sanitation Districts has since been an important supporting arm in the development and maintenance of South Coast Botanic Garden. Whenever additional funds, labor, or equipment are needed, the Sanitation Districts has been extremely helpful.

The development of South Coast Botanic Garden on a former landfill has proved that the elimination of trash can result in greater neighborhood beauty and increased property evaluation. Of course, the thought of having a dumpsite close to one's home instantly creates a negative attitude with just the opposite conclusions. As a consequence, the Sanitation Districts has had to work very hard, not only to find new sites for landfills or dumps, but also to convince the local residents of their necessity and potential benefits.

To sanitation engineers, the increasing amounts of household and industrial trash present a real problem, even a threat. Since burning and ocean disposal are either limited or forbidden, the bury and cover method is the only option, though recognized as not the most efficient or desirable. However, with the present energy shortages, new studies and tests indicate landfill wells can produce a bonus in the form of methanol for use in homes and autos. At present, this botanic garden has two 100-foot wells in which the rate of trash decomposition in the presence of moisture and the resulting methane production, is being studied.

This is another in a series of articles by Armand Sarinana, South Coast Botanic Garden superintendent, tracing the [illegible] and development of that garden.

Forest of *Quercus agrifolia* at Descanso Gardens.

An Arboretum is for people . . .

California native oaks like those at Descanso Gardens in La Canada live about 500 years in their natural state. In cities and towns, however, their lifespan is often shortened by a root disease (**Armillaria mellea**) that develops from uncontrolled artificial irrigation.

To help homeowners keep oaks on their property healthy, horticulturists in the Los Angeles County Department of Arboreta and Botanic Gardens have prepared a bulletin outlining maintenance procedures. For a copy, write to Public Services, Arboretum, 301 N. Baldwin Ave., Arcadia 91006.

SCE

Southern California Edison Company

BOOKSHELF

HOW TO MAKE CUT FLOWERS LAST by Victoria R. Kasperski; William Morrow Co., New York 1975. Paperback.

This book is a must for the novice in floral arranging. It is especially good for the self-instructed aspirant entering a local show. A basic and important need for this kind of book has been met by this author. Put to practical use, it will enable the reader to fulfill his desire to win ribbons or satisfy his or her own pleasure in a long-lasting attractive arrangement. The author has listed the flowers alphabetically for easy reference, thus relieving the reader of countless experiments in conditioning plant material. She has also included a chapter on drying, pressing, dyes, and making flower potpourri.

GARDENING FOR FRAGRANCE by Nelson Coon; Hearthside Press, New York 1970.

This book is different in its approach to the sense of smell through gardening. It is an informative book covering the numerous ways fragrances are useful in our lives. The author writes of the alluring scents, plus some not so alluring, which focus a picture on our minds of nostalgic scenes so dear to everyone's heart. He classifies the characteristics of these odors. He stresses the awareness of scents, the how and why, the use in religion, sex, and control of objectionable odors such as smog. There is much to add to our store of knowledge. Mr. Coon has evidently done some deep study on his subject, making us acutely aware of the needs supplied by fragrances. The aromatic qualities, including scented leaves, of all kinds of plants are discussed. The use of fragrances to give pleasure to the visually handicapped is only one facet which he covers. The need of distances to dilute overpowering odors and plants which must be inhaled at close range to enjoy are also included. Nighttime scents and moisture-induced odors plus the many odors of roses are a few mentioned, including fragrances from the wild and the roadside. This book is a welcome change from the usual volumes on fragrant plants.

—Jean Cozart

Other new acquisitions to LASCA Plant Science Library:

THE DIAGNOSIS OF PLANT DISEASES, Rubert B. Streets, Sr. Univ. of Arizona Press, Tucson. 1972. 226 p. Illustrations

GARDENING WITH WILD FLOWERS, Frances Tenenbaum. Scribner's, New York 1973. 206 p. Black and white and color illustrations.

THE INDOOR LIGHT GARDENING BOOK, George A. Elbert. Crown, New York. 1973 250 p. Black and white and color illustrations.

THE INTERNATIONAL BOOK OF TREES: a guide and tribute to the trees of our forests and gardens, Hugh Johnson. Simon and Schuster, New York. 1973. 288 p. Color illustrations.

THE IVY BOOK; the growing and care of ivy and ivy topiary, Suzanne Pierot. Macmillan, New York. 164 p. Illustrations.

THE NEW YORK TIMES BOOK OF HOUSE PLANTS, Joan Lee Faust. Quadrangle. New York. 1973. 274 p. Blanck and white and color illustrations.

THE ORCHIDS: scientific studies, Carl L. Withner, ed. Wiley-Interscience, New York. 1974. 604 p. Illustrations.

PLANTS AND ENVIRONMENT; a textbook of plant autecology, R. F. Daubenmire. 3rd ed. Wiley, New York. 1974. 422 p Illustrations.

TROPICAL CROPS: monocotyledons, J. W. Purseglove. Halsted Press, New York. 1972. 2 v. Illustrations.

WILD FLOWERS OF BRITISH COLUMBIA. Lewis J. Clark. Gray's Publ. Ltd., Sidney. B.C. 1973. 591 p. Color illustrations.

KUNZEA PULCHELLA (Cover)

Kunzea pulchella is a medium-sized shrub that reaches a height of 10 feet. It has a spreading, fountain-like habit that is graceful and makes it valuable for an accent plant. A native of western Australia, this evergreen shrub is particularly suited for small gardens. The leaves are small, about ½-inch long, with rounded ends and a gray-green color. The growth rate is moderate and it seems to tolerate a variety of soils except those that are heavy and poorly drained. It should be planted in a location receiving full sun.

The flowers of *K. pulchella* are extremely showy, dark red, and reminiscent of eucalyptus or bottlebrush flowers in that it is the stamens that are showy. The contrast between the gray foliage and the red flowers is striking. It is not yet available in most nurseries, but can be acquired in limited quantities from the California Arboretum Foundation, Inc., located at the Arboretum in Arcadia. Nurseries interested in growing the plant for sale may acquire cutting stock by contacting the Arboretum superintendent.

ARBORETUM WEATHER

Lat. 34°08'48" N.
Long. 118°02'59" W.
Elev. 571.28 ft.

Weather season:
Oct. 1 to Sept. 30

	February	March	April
Average daily maximum temperature	66.5	66.4	68.1
Average daily minimum temperature	41.5	44.5	44.3
Highest temperature	82	79	83
Lowest temperature	34	35	32
Number of clear days	10	13	6
Number of partly cloudy days	12	10	11
Number of cloudy days	3	6	10
Rain during this month	2.84	4.58	1.80
Total rain since Oct. 1st	8.39	12.97	14.77

Calendar

June, July, August, September

ARBORETUM, Arcadia

June 1 — 10 a.m.
Sunday Morning Walk*
"Greenhouses"
Tim Lorman, horticulturist

June 21, 22 — 8 to 5:30 p.m.
Gladiolus Show*
Presented by the Southern California Gladiolus Society

July 4, 5, 6 — 9 to 5:30 p.m.
Cactus Show*
Presented by the Cactus and Succulent Society of America

July 12, 13 — Sat. 1 to 5 p.m.
Sun. 8 to 5 p.m.
Begonia Show*
Presented by the San Gabriel Valley American Begonia Society

Sept. 19 — 6 p.m.
Queen Anne Frolic
Presented by California Arboretum Foundation for members and their guests.

Sept. 21 — 2 p.m.
Sunday Afternoon Lecture*
"Decorative Plants from Dinner Leftovers"
Tak Niiya, chief of Education Division

Sept. 28 — 10 a.m.
Sunday Morning Walk*
"Asiatic North American Section
Frank Simerly, assistant director

*Sponsored by California Arboretum Foundation

DESCANSO GARDENS, La Canada

June 1 — 9 to 5:30 p.m.
Annual Art Festival
Presented by Descanso Gardens Guild

June 8 — 10 a.m.
Sunday Morning Walk*
"Roses and Annual Flower Beds"
George Lewis, superintendent

June 8 — 3 p.m.
Leiderson German Band and Bavarian Dancers

June 14 — 3 p.m.
Chamber Singers of Pasadena High School

June 22 — 3 p.m.
La Canada Folk Dancers

June 29 — 3 p.m.
Sutter String Quartet

July 13 — 3 p.m.
Symphonetta Strings

July 19, 20 — 3 p.m.
La Canada Players—Children's Plays

July 26, 27 — 3 p.m.
Glendale Community Symphony

Sept. 27, 28 — Sat. 12 to 5:30 p.m
Sun. 8 to 5:30 p.m.
Bonsai Show*
Presented by the Descanso Bonsai Society

*Sponsored by Descanso Gardens Guild

SOUTH COAST BOTANIC GARDEN, Palos Verdes Peninsula

June 8 — 10 a.m.
Sunday Morning Walk*
"Flowering Plants"
Armand Sarmiento, superintendent

Sept. 4, 5, 6 — 9 to 4 p.m.
Costa Verde District Garden Clubs
Flower Show Judging Course
Presented by Costa Verde District Garden Clubs

Sept. 28 — 2 p.m.
Sunday Afternoon Lecture*
"Outdoor Container Gardening"
Edward Hartwiegel, assistant superintendent

*Sponsored by South Coast Botanic Garden Foundation

BIRDWALKS

ARBORETUM
1st Sunday of each month at 8 a.m.

DESCANSO
2nd and 4th Sunday of each month at 8 a.m.
Sponsored by San Fernando Audubon Society

SOUTH COAST BOTANIC GARDEN
3rd Wednesday of each month at 8 a.m.
Sponsored by South Coast Botanic Garden Foundation

September
1975
Vol. XXV
No. 3

Lasca Leaves

Missouri Botanical
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Lasca Leaves

Published quarterly by the California Arboretum Foundation, Inc., for the Department of Arboreta and Botanic Gardens of Los Angeles County.

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Editor
Donald S. Dimond

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Department Notes

BOARD OF GOVERNORS

THE BOARD OF GOVERNORS of the Department of Arboreta and Botanic Gardens elected Mrs. Marilyn C. Stoke its new president, succeeding Mrs. Mary M. Bittner who had completed her term. Mrs. Stoke will serve on the Department's coordinating committee made up of the presidents of the Descanso Gardens Guild, South Coast Botanic Garden Foundation, and the California Arboretum Foundation. She will also serve on the Department's Building Committee.

The County Board of Supervisors appointed one new member to the Board of Governors, Mr. Thomas E. Smith, and reappointed Mrs. Ruth Mary Larson, a resident of Pasadena as is Mr. Smith. Mrs. Larson is a past president of Las Voluntarias, volunteer organization of the California Arboretum Foundation, and is currently first vice-president of the Foundation's Board of Trustees and chairman of its Gift Shop Committee. She has been very active in recent years in just about all of the Foundation's affairs, notably this year in the Baldwin Bonanza and in the preparation for the forthcoming Queen Anne Frolic. Mr. Smith, a member of the Foundation for the past two years, is vice-president of Community and Public Affairs for California Federal Savings, a member and vice-president of the California Museum of Science and Industry, and a member of the Tournament of Roses Committee.

FOTA CONTEST

WITH THE idea that a contest would be challenging fun for photographers looking for new locations to capture on film and at the same time afford new visitors the opportunity to gain a closer look at the plantings and programs of the Arboretum, the California Arboretum Foundation last year introduced its first FOTA contest. One of the basic rules was that all pictures had to be taken at the Arboretum, hence the name "FOTA," an acronym for "Focus on the Arboretum." The contest was so enthusiastically received it is being repeated this year, the same rules prevailing—open to all, any subject so long as it is taken within the Arboretum grounds, in color or black and white. Prizes totaling twelve hundred dollars will be awarded the winners in the various categories and age groups. Other awards include ribbons, plaques, a photography scholarship, and certificates of merit. The winning photographs and those accepted for hanging will be exhibited for a week in the Arboretum's lecture hall starting November 23rd. Photographers are invited to pick up entry blanks containing eligibility and other requirements at the Arboretum Information Center.

Members of the California Arboretum Foundation who are sponsors of FOTA 1975, and who have made possible individual awards in four classifications and five separate divisions are: Mrs. Warren Williamson, Mr. and Mrs. Robert P. Strub, Mrs. E. Mudd Marvin, Mrs. John Mage, Mrs. Harry E. Laughlin, G. B. and L., Mrs. Preston Hotchkiss, Mrs. Lorene Charis, Mr. and Mrs. Harrison Chandler, Mrs. Merrill Bittner, and Mrs. Marie Armstrong.

This will be the South Coast Botanic Garden 7,000-square-foot auditorium. Main entrance (not seen) will be from the right.

PROGRESS REPORT

A VISIT TO SOUTH COAST early last month revealed considerable progress in the construction of the new buildings. Size, cost, and other basic facts were reported on in our previous issue. An interesting aspect of the construction is the huge sheet of plastic permanently placed underneath the entire auditorium building and going part way up the sides to serve as a barrier against the vapors of methane gas, a product of trash decomposition. It is remarkable, incidentally, to see near the adult education vegetable plots a few small fissures from which gas vapors are noticeably escaping and at the same time see the 8-foot-high corn, the pole beans, the cucumbers and squashes ready to offer a rich harvest. We also learned that the distance from what will be the main entrance off Crenshaw Boulevard to the administrative building is just under two-tenths of a mile. At the time we were measuring this distance in photographer Bill Aplin's diatomaceous-dust-covered Ford, trenches were being cut for the electric cables that will energize the floodlights that will illuminate the entire entrance road.

A favorite take-home project for youngsters in Container Gardening class is making their own terrarium.

EDUCATION

THE FALL schedule of classes in this Department will essentially repeat the popular educational programs established in recent years. Youth Education will offer six identical classes at each garden, beginning September 30 at the Arboretum, October 1 at Descanso Gardens, and October 16 at South Coast Botanic Garden. Classes in Indoor Gardens will use a terrarium and succulent plants to illustrate the basic principles in starting and maintaining plants indoors. In Vegetable Gardening students will learn by planting, maintaining, and harvesting their own individual plots. In Plant Propagation students will explore simple and advanced propagation techniques and the function of greenhouses, and will take part in practical class projects. Exploring Nature consists of a field environmental study, and Container Gardening examines all aspects of growing plants in containers. These are classes for young people in kindergarten through the 10th grade. They meet for an hour and fifteen minutes after school and for two hours Saturday mornings. The classes are invariably filled quickly, so parents interested in enrolling their children in any of them are advised to write at once to Youth Education at the garden nearest them requesting a registration and class schedule form.

Adults can choose among seven classes at the Arboretum, four at Descanso, and three at South Coast.

At the Arboretum there are beginning and advanced classes in bonsai, two home gardening classes, one home gardening class focusing on fruit and berry culture.

and one class each in plant identification and vegetable gardening. The fruit-and-berry-culture gardening class will be offered at Descanso along with classes in home gardening, home horticulture, and poisonous, medicinal, and edible plants. Classes at South Coast are in home gardening, container gardening, and bonsai. Classes at all gardens are sponsored either by Pasadena City College or Los Angeles Harbor College, and all require a modest fee. Complete schedules may be obtained at each garden by calling or coming to the Information Center. The first class at the Arboretum and at Descanso starts September 15; at South Coast September 17.

Three years ago the California Arboretum Foundation introduced a series of minicourses that, judging from the response, filled a sizable segment of public interest. Then as now they were intensive courses in both practical and academic aspects of botanical and horticultural subjects meeting in three to five three-hour sessions, mostly in the mornings. This fall, minicourses will be offered at the Arboretum in Indoor Container Gardening, Poisonous, Medicinal, and Edible Plants, Growing Bulbs in Containers, Hanging Baskets, Patio Container Gardening, Botany I and II, Pruning Trees and Shrubs, Terrariums, Plant Propagation Workshop, Bromeliads, Plant Diseases, and Plant Propagation. All instructors are from the Arboretum staff. The courses are available to members of the California Arboretum Foundation at a 20% discount. Complete schedules of the minicourses are available at the information window at each garden.

Students learn to recognize over 100 plants in Dr. Leonid Enari's Plant Identification class.

SOUTH COAST

DR. PAUL SAFFO, having completed three active years as president of the South Coast Botanic Garden Foundation, was succeeded by Mr. Cliff Graham, a vice-president and member of the Board of Trustees for two years, president of the Palos Verdes Unified School District, and active in recent years in Palos Verdes community affairs. During his term of office Dr. Saffo was instrumental in gaining approval for the new South Coast administrative complex and had the satisfaction of seeing the buildings become a reality.

QUEEN ANNE FROLIC

ON THE SOUND theory that a successful program should not be tampered with, this month's "Queen Anne Frolic" (Friday, September 19) will largely duplicate the Frolic of 1973 that was so thoroughly enjoyed by members of the California Arboretum Foundation and their guests. Nevertheless, Wendy Taylor, CAF member who is co-chairing this year's event with fellow-member Jane Buck, reports on one addition certain to be popular, namely, a raffle of two round-trip tickets to Hawaii donated by Western Airlines. Further, she said, the sale of raffle tickets will be limited to 1,000 by way of increasing the chances of winning. For the rest, the entertainment will again includes rides around the grounds in vintage cars, paddle boat rides, tours of the Queen Anne Cottage, and music by the Temple City Senior Citizens Kitchen Band, the Arcadia Gaslight Choir, and the dance music of Dexter Jones and his orchestra. Ruth Mary Larson reports that the menu will feature Director Francis Ching's barbecued roast beef along with rice pilaf, cheese rolls, bean salad, and coleslaw, and will end with fresh fruit compote and Ruth Mary's own homemade cookies. Tickets, available as always only to CAF members and their guests, are $15 for one and $25 for a couple. Starting time is 6 p.m.

HORTICULTURAL HONORS

TWO ARBORETUM staffers, Jack McCaskill of the Plant Records Section and Bill Hawkinson, assistant superintendent, won awards recently for their work in hybridizing iris. Jack, whose specialty is California iris, won an Honorable Mention Award for his hybrid 'Casilda'. Bill, whose specialty is aril-bred iris, won the C. G. White Award for his hybrid 'Grand Vizier', the highest award an aril-bred iris can win. Bill also received Honorable Mention awards for three other hybrids: 'Carioca', 'Enchanted Hour', and 'Temple Veil'.

NEW CHAIRMANSHIP

MRS. JOHN NICHOLAS FEHRER, a member of the California Arboretum Foundation Board of Trustees 1967-1973, and State President of California Garden Clubs, Inc. 1972-1974, has recently been appointed Chairman of Arboreta and Botanical Gardens, a new national chairmanship, by Mrs. Vernon L. Connor of Mount Dora, Florida, President of the National Council of State Garden Clubs, Inc.

Mrs. Fehrer's goal in this new national chairmanship is, in her own words, "to assist the fifty state federations of the National Council of State Garden Clubs in building bridges for greater cooperation between garden clubs and arboreta and botanical gardens to the mutual benefit of both organizations."

Besides her new responsibility, Mrs. Fehrer will remain active locally in the Hill Toppers Garden Club of Altadena, the Los Angeles Garden Club, the Flora-lia Guild Chapter 20, and the Arboretum District of California Garden Clubs, Inc.

PLANT PORTRAITS

English Oak

Leonid Enari

When British sailors sang "Hearts of oak are our ships, Gallant tars are our men, . . . " they knew that as long as oaks were growing in the British Isles there would be British ships cutting the waves of seas and oceans and British men on them willing to fight and die for England.

The wood of the oak was preferred above all others for shipbuilding in England because of its many admirable qualities. It is hard, strong, tough, durable, tolerably flexible, not too heavy, and not readily penetrated by water. Also, when struck by a cannon ball it did not splinter, so that any hole made through the hull was consequently easy to plug.

English oak (*Quercus robur*) is a large, majestic tree holding the same rank among the forest trees of the temperate

zone that the lion holds among the beasts and the eagle among the birds. It is the king of forests and a true representative of England. It certainly is more English than the lion, the unicorn, the bulldog, or any other imaginable quadruped.

The leaves are obovate in general outline, with three to seven pairs of entire or rounded lobes, stalked, slightly hairy when young, and glabrous and somewhat coriaceous when adult. Their color is olive-green, changing to golden yellow with some green left and then to pallid russet as the season advances. They may remain in a withered state on the tree until spring.

The flowers appearing with the leaves in the spring are of two kinds, male and female, but occur on the same tree. The male, or pollinating flowers, each consisting of a six- or seven-lobed calyx and 10 stamens, are in many-flowered pendulous catkins. The female, or fruit-bearing flowers, each consisting of a six-lobed calyx and a pistil are in one-to five-flowered spikes. The calyx is surrounded by the numerous overlapping scales or bracts, which afterwards form the cup of the fruit.

The fruits, usually known as acorns, are ovoid to cylindrical, one-seeded, smooth, glossy and enclosed about ¼ or 1/3 by the cup. The acorns were much valued in the past as food for hogs and other animals, but in times of scarcity were also used by man. For human consumption they were ground into meal, tempered with water, and made into bread.

Those who cut down an oak tree in England in the seventh century were fined thirty shillings, and those who felled a tree under whose shadow thirty hogs could stand were fined sixty shillings, the very sound of the axe being sufficient for conviction.

Like most long-living trees, the oak is

Drawing by Patty Lawson.

of slow growth, averaging about a foo and a half in circumference in twenty years, and increasing about one inch a year during the first century of its existence, after which the rate of growth diminishes. Exceptions, however, are not wanting. One of the most remarkable oak forests in Britain is Witman's, Wistman's, or Welshman's Wood, on Crockern Tor, Dartmoor, at an elevation of 1,400 feet. It contains about a thousand of the most stunted oaks in existence, growing among granite boulders in a very exposed and windy location. A cross-section of one of these trees made in 1863 showed 163 years of growth, yet the tree was only nine inches in diameter.

English oak can reach an impressive age and size. Trees one thousand years old and more are found in various parts of England and continental Europe. Very old trees usually are nothing more than hollow trunks with mutilated limbs and

*This 100-year-old **English oak at the Arboretum** is located just west of the Queen Ann Cottage.*

boughs of green branches arising from the stumps.

The hollow old oaks are called bull oaks in England from bulls taking shelter within them, which they do not by going in and turning around, but by retreating backwards into the cavity until the head alone projects at the opening.

J. C. Loudon, in his Arboretum et Fruticetum Britannicum, Volume 3, published in 1844, gives an account of the most celebrated English oaks found in the British Isles. Without doubt, the vast majority of the oaks discussed by him are still surviving.

English oak, or British oak as it is

known in England, is associated with many customs, stories, legends, and historical events.

The celebrated conference between the Britons and the Saxons, after the latter invaded and occupied parts of Britain in the 5th and 6th centuries, was held under the oaks of Dartmoor in Devonshire. After the conference, the Britons gave up the kingdom and retired to Wales.

The yule log or yule block with which the Christmas fire in England was kindled, was always of oak. A fresh log was thrown on and lighted, but taken off before it was consumed, and reserved to kindle the Christmas fire of the following year.It was thought that some misfortune would befall the house if any accident happened to the yule log.

The Round Table of King Arthur, preserved in the eastern end of the ancient Chapel of St. Stephen, in the Castle of Winchester (now the County Hall) is also of oak. The table bears the figure of the king, so famous in the old romances, and the names of his knights, including those of Sir Galahad, Sir Garath, Sir Gawaine, and Sir Tristram. It must have been cut from an oak of immense size, since it measures eighteen feet in diameter. Henry the Eighth is said to have shown it to Charles the Fifth, King of Spain and Emperor of the Holy Roman Empire, and his other visitors as the actual table made and placed there by King Arthur.

It is doubtful, however, if the table in the Castle of Winchester is the one used by King Arthur. According to legends and stories of the Middle Ages, King Arthur ruled the Britons in the sixth century. His court was at Camelot. After being severely wounded by his brother Modred, who had tried to overthrow him, he was carried away secretly to the Isle of Avalon to be healed. What happened to him there is not known and he never returned to England. The legends also tell us that the knights at his court sat with him around the table called Round Table, that the table was of marble, and that it was created by Merlin, a magician in the court. Some persons believe that Camelot is the former castle of Winchester, others that it is in Somerset, or even in Wales or Scotland.

Few English trees have a wider geographical range than the English oak. It ranges from the Highlands of Scotland to the Urals of Asia, and is also found in Caucasia, Asia Minor, and North Africa. The vast forests of English oak which covered the greater part of England and central Europe centuries ago have disappeared, however, because of the demand for superior building material and also because of the need for agricultural open land. Forests and civilization appear to be incompatible.

At the Los Angeles State and County Arboretum, English oaks are found in quadrants H/6, H/7, J/12, M 8 and P/13. The largest specimen in quadrant M/8 (between the Queen Anne Cottage and the Coach Barn) is 73 feet high, has a spread of approximately 60 feet and a trunk diameter of 2 feet 7 inches at a height of 4½ feet. It is approximately 100 years old. During the hot summer months special events are held under this tree to take advantage of its cool shade. English oaks are also planted at Descanso Gardens in La Canada and South Coast Botanic Garden on Palos Verdes Peninsula.

Dr. Enari, author of this series of articles on plants at the Arboretum, is a senior biologist in the Department's research division, taxonomist, chemist, teacher, and author of a number of textbooks on botany.

Agapanthus

Wayne Loescher

IN A CONTAINER outside the greenhouse there stands a Nile Lily, in spectacular full bloom at this time of year. To someone from outside Southern California, such a sight would be reason to stop and contemplate. But the natives pass by, their horticultural appetites jaded by a benevolent climate that makes such a display

routine, a part of ground covers and boulevard and median-strip plantings.

The Nile Lily has not always been so undervalued. Although the records are poor, it apparently was first introduced into Europe during the 1600's, only shortly after its discovery. There is a record of its cultivation in 1687 and its flowering was reported in Hampton Court Garden in England in 1692. Somewhere along the line it acquired its common name; an unfortunate choice, perhaps, since it is kind of a misnomer. Actually the plant originally came from South Africa. No wild specimens are found North of the Transvaal, more than 1,000 miles to the South of either branch of the Nile. And also, it is not a lily; instead, it belongs to the genus *Agapanthus* (from the Greek, love-flower) which is more closely related to the onion and amaryllis than to the lilies.

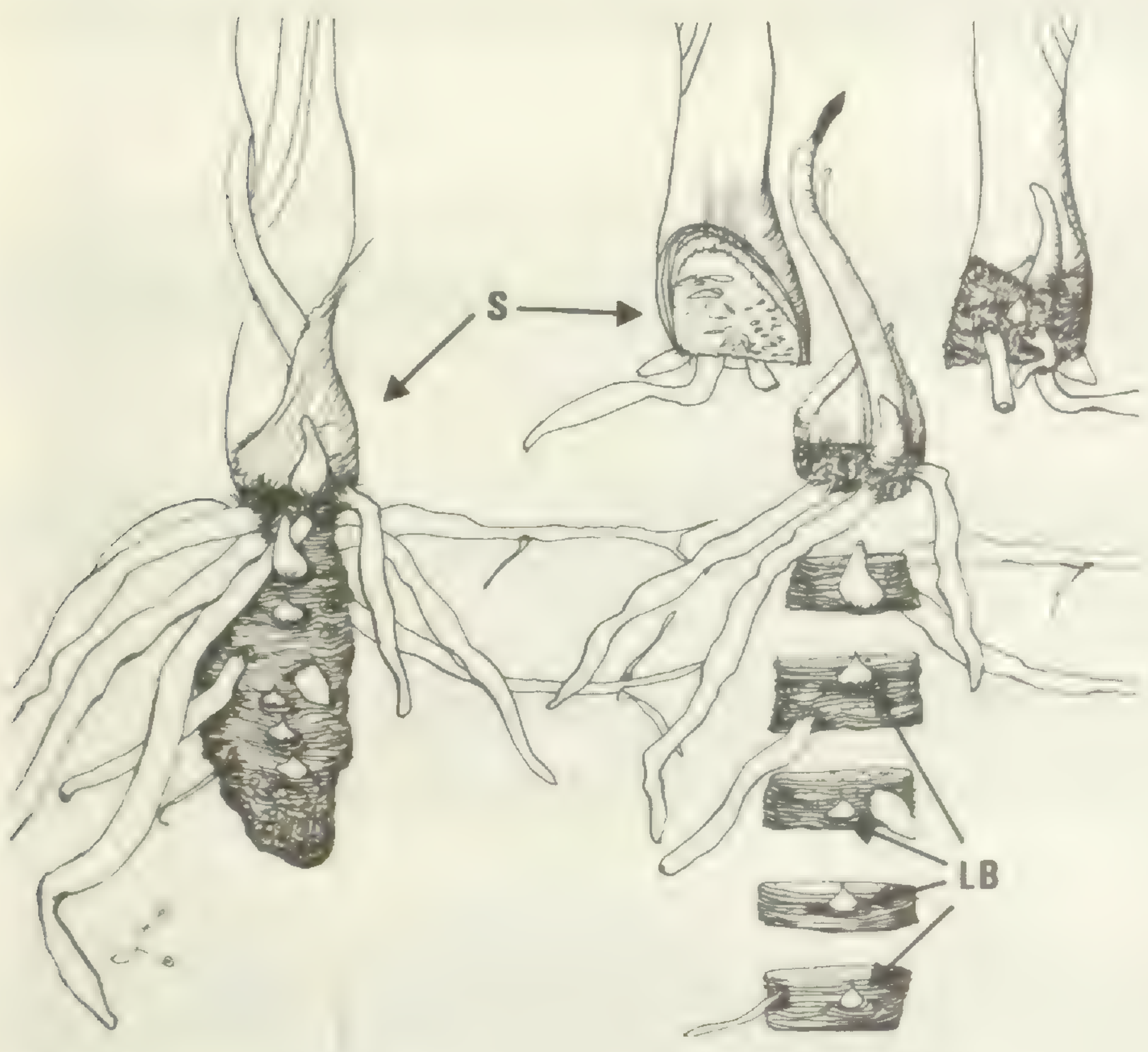
Questions concerning appropriate nomenclature are not restricted to the common name of *Agapanthus*. There is considerable doubt surrounding the identity of the species grown in cultivation. The reason for this goes back to the origin of most of the common cultivated varieties. In its native habitat, *Agapanthus* exists as some twenty different species. There may be more, or perhaps less. It is agreed by most authorities that, whatever the total number, the various species separate into two distinct groups. Although both groups are from South Africa, the first group inhabits only the coastal lowland region from Cape Town to Durban and somewhat beyond. These species are generally evergreen and non-hardy. The second group of species is native to the inland mountains and high tablelands where there is often hard frost in the winters. These species are deciduous. In fall the leaves turn yellow and the plants die down until new growth begins again in the spring. Members of this group are quite hardy. They are, however, more compact plants with smaller umbels of flowers and with less color variation than their coastal relatives. When botanic gardens, both in South Africa and Europe, established collections of both groups of the wild species no efforts were made to prevent insects from cross-pollinating the various plants. It turned out that all the species hybridize freely and seed collections made from named plants in the botanic gardens carried no guarantee of their paternity. Since few new collections of the wild species were made, over the years the identity of cultivated specimens of *Agapanthus* became more and more confused. Not surprisingly then. L. H. Bailey, in 1949, in his *Manual of Cultivated Plants*, recognized only one species, *Agapanthus africanus*, which he described as being quite variable.

The uncertain ancestry of cultivated *Agapanthus* has had some advantages. Originally, the only plants grown in Europe were derived from the non-hardy coastal species. Gardeners soon learned that specimens could only be maintained in greenhouses or in tubs that could be moved indoors or under cover in winter. Hybridization, either accidentally or intentionally, of the coastal species with the hardy, upland species, which were introduced to Europe somewhat later, eventually resulted in large numbers of plants with varying degrees of tolerance to frost. At the same time, selections were made that resulted in specimens with striped leaves and with flower colors ranging from white to deepest blue. Other selections yielded many forms, varying in stature, in number and size of flower, in size and breadth of leaves and in season of bloom.

This variability is not without its disadvantages. A hybrid ancestry usually means that the progeny of a plant are unlikely to possess all the traits that made

Older, tangled agapanthus clumps can be divided by separating individual rhizomes. Care should be taken to avoid seriously damaging the sometimes brittle, thick fleshy roots.

Drawings by Patty Lawson.



A single rhizome can be cut into small sections yielding separate, although slow-to-develop plants. The most recently formed shoot **(S)** *should be severed with one or two roots attached, and then additional plants may be obtained by cutting the older portions of the rhizome into sections, making certain that each section bears one or more lateral buds* **(LB)**.

their parent so superior. Thus, even though *Agapanthus* can easily be propagated from seeds, and in fact often is, especially whenever large numbers of inexpensive plants are needed for use in an extensive planting, it is preferable to propagate the plant vegetatively.

Vegetative propagation requires no special skills. The plant has a rhizome, much like that of an iris, and its propagation is quite similar. The rhizome is thick, fleshy and short. It usually occurs in tangled clumps consisting of short individual sections. Each section has at its apex a growing point that will eventually develop into a flowering stalk. One or more lateral branches usually are present a short distance behind the apex. Once the apical growing point forms a flowering stalk, it undergoes no further growth, and all subsequent growth of the rhizome continues from the lateral branches. The plant is, however, strongly apically dominant; that is, growth of the bud closest to the tip will generally inhibit, or slow, development of buds further down on the rhizome. Thus, when dividing the plant if one notes the location of the several lateral buds present on the section, and then cuts the section so that each piece bears a bud, one can obtain a plant from each piece. If one just separates the sections as is done with irises, only the most terminal bud will develop into a new plant. This latter process is not all that inefficient, however. A mature *Agapanthus*, two or three years old, may yield a dozen plants. But, subdividing each section even further will yield two to three times as many.

Whatever the division techniques chosen, timing is important. Although the plants can be divided anytime they are not dormant, the best time of year for conventional division is in the early spring when the first green shoots are just beginning to appear. By this time, however, those same green shoots have repressed the development of lateral buds that might have been induced to develop using the more drastic division technique. To obtain the most plants, subdivision of each section of a rhizome should be done shortly after the cessation of flowering and fruiting in late summer. At this time there is apparently little apical dominance and each lateral can be induced to undergo some development before becoming dormant in the fall. Sections can be divided later in the year but there will not be any significant growth until the following spring.

In Southern California, *Agapanthus* grows extremely well in what seems to be a wide variety of soil types and habitats. Outside Southern California and areas with similar climates, even the most hardy varieties will be damaged by temperature in the low twenties. Also, some problems may be encountered if plants are grown in heavy or poorly-drained soils. Although in most locations the plants do best in full sun, in the hot inland valleys partial shade will prevent damage to the foliage and will result in a nicer appearance. During the growing season the plants thrive when watered frequently, but they can withstand an occasional short drought. The plants tolerate crowding well, and frequent division of the rhizomes is unnecessary, perhaps only every 5 to 6 years.

Dr. Loescher is a biologist in the Department's research division. His special interest is plant physiology, in particular the development of new techniques in plant propagation.

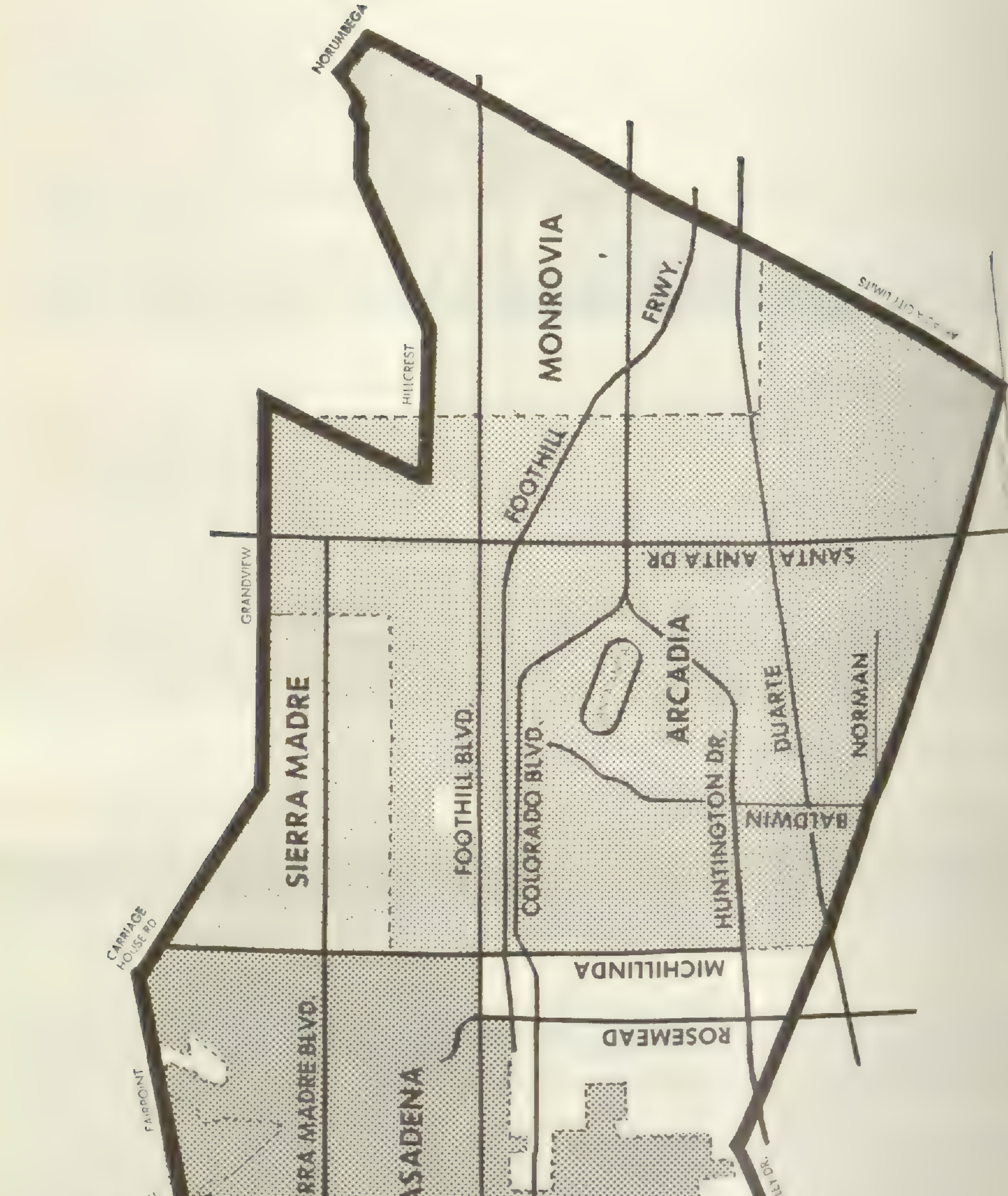
California Living

The Ranchero

Sandy Snider

FROM EARLY TIME, man has been attracted by the fertile beauty of the area occupied in part today by the Los Angeles State and County Arboretum. First to settle on this rich land were Stone Age Shoshone Indians, whose primitive way of life abruptly gave way in 1769 to the greater plans of the King of Spain. Fully two hundred years after discovery by Spanish explorers, Franciscan padres collaborated with soldiers of the Crown to establish religious, military, and economic footholds in Alta California. Arm in arm, Church and state gently persuaded, and often coerced, the native Indian population to relinquish their primitive freedoms in exchange for the security and comfort of the mission complex.

The Hugo Reid Adobe. During the early rancho period. flouers and shrubbery were a rare sight around the houses of the Californians — the threat of Indian raids demanded a free range of view.



The map shows the boundaries of Hugo Reid's original 13,316-acre Rancho Santa Anita and the present-day cities that land grant embraced.

Mission San Gabriel (1771) claimed a good many converts, Indians who would theoretically acquire Spanish culture and eventually enter society as new Spanish citizens. To implement their theory of total conversion, missions became more than simple centers of faith. Charged with instructing the natives in everything from the sacraments to bricklaying, the padres gradually became masters of strong economic units—missions became self-sustaining ranches complete with orchards, irrigation, livestock, and industries.

Rancho Santa Anita (the heart of which evolved into today's Arboretum) traces its origins to the mission period. As explained by an early California chronicler, Alfred Robinson, "The two 'ranchos' of St. Bernardino and Sta. Anita are included in the possessions of the Mission; the former of these has been assigned by the padres for the sole purpose of domesticating cattle, and is located some leagues distant, in a secluded valley among the mountains: the latter is for cultivation, and is one of the fairy spots to be met with so often in California."

Commanding vast acreage and free Indian labor, the mission system reached its high point in power and influence during the early years of the nineteenth century. Mexico's successful revolt against Spain in 1821 marked the beginning of the end of mission domination, however, as the new government insisted that the wealth and lands of the missions be turned over to the state. Accordingly, in 1833, government order secularized the missions, completely removing them from church control and granting their former landholdings to the new California pacesetters—the rancheros.

Rancho Santa Anita almost literally became free for the asking to any Mexican or naturalized citizen who promised to obey the laws of Mexico, embrace the Catholic religion, and bend the ear of the right government official. In 1839, Hugo Reid, native of Scotland, Cambridge graduate, veteran of several years of trade in South America, newly naturalized Mexican citizen and Catholic, husband of the beautiful Mission Indian, Victoria, adoptive father of Victoria's four Indian children, pioneer anthropologist who later recorded primary information on the rapidly dying Gabrielino Indian culture, in short, a versatile and ambitious adventurer, applied for and two years later received provisional title to the 13,316-acre Rancho Santa Anita.

To verify his intentions, Don Perfecto, as he was called, began construction of a ranchhouse, "flat roof'd and corridor'd," in the typical Los Angeles style. Handmade, sun-dried adobe brick walls, and a roof smeared with brea (from the tar pits of the Pueblo) to keep out the rains, constituted visible evidence of intent to settle. Though the Reids continued to live in their more pretentious San Gabriel home (Uva Espina), there were frequent visits and visitors to Rancho Santa Anita.

The gracious hospitality found throughout California during the rancho period was equally evident at Santa Anita. Reid's wife, Victoria, a successful product of the mission theory of total conversion, was a model of Castilian gentitlity. Visitors were "surprised and delighted with the excellence and neatness of the housekeeping of the Indian wife, which could not have been excelled."

Readers today are often equally "surprised and delighted" to discover the epicurean paradise that could be found in rancho life. Guests at Santa Anita recorded, "We feasted daily on good food. For breakfast we had honey (the production of the land, and in fact everything we ate was), fresh eggs from the poultry yard . . . coffee, with rich cream; choco-

late and tea; 'chino beans' (curley beans) . . . tortillas made of flour or corn; but no butter, strange to say, with hundreds of cows on the place, but however this was characteristic of the ranchos at that season of the year." The midday meal of "beef steak with or without onions, broiled beef, stewed chickens, or hash made of carne seca (dried beef) with scrambled eggs mixed, seasoned with onions, tomatoes, and a sprinkling of red pepper, beans prepared with plenty of gravy . . . homemade bread, California wine, and finished with black coffee" was surely enough to loosen the belt of the hardest working ranchero. Still to come, though, was dinner "of chicken soup, roast ducks, guisado de carne richly flavored, sweet potatoes grown on the land, frijoles, chicken salad, and lettuce. This fine dinner was served with old wine of the make of the Mission of San Gabriel, and custard and pies and coffee.'" Harris Newmark, one of the lucky visitors, justly concluded that "The hospitality shown to McKinley and myself, not only by Reid himself but by his Indian wife, was sumptuous. A Castilian lady of standing could not have bestowed on us any greater attention or graciousness than was extended to us as I have described at the 'Santa Anita'."

In his role as a working ranchero, Don Perfecto sought to further strengthen his land-grant petition and noted, "I have sown 10 fanegas of wheat—cleared ground to put in a vineyard of 10,000 vines and 1,000 fruit trees. I have put on the farm . . . 62 mares and in April intend putting on my stock of cattle."

The cattle stock, almost without exception, was the staple of the rancho economy, even on a rich agricultural ranch as the Santa Anita, and the annual "matanza" (steer slaughtering) provided a first-hand lesson in ranchero economics. From July through September, some fifty to one hundred (at a time) of a rancho's fattest steers were butchered to produce fifty to one hundred "California leather dollars" (hides), seventy-five to one hundred pounds of interior tallow for shipment, forty to fifty pounds of higher grade surface tallow ("manteca") for domestic cooking purposes, and some two hundred pounds of beef, cured and dried for local consumption. Hides and tallow, carefully prepared for shipment, became rancho currency, used in trade with foreign shippers to obtain household and manufactured items not available in the dusty pueblo stores, while the still meaty carcasses, stripped of their "cash value," were left to spoil in the sun, banquets for buzzards.

The rancho period in California's story has been commonly acknowledged as one of pastoral simplicity. Rich in land and cattle, sustained by a strong economic system, and secure in a remarkable absence of theft and banditry, California was a provincial Garden of Eden. Not until the discovery of gold and the rapid influx of "Americanos" was the ranchero unduly disturbed by the world beyond his boundaries. Lured to the gold fields and caught up in the new demand for meat from the burgeoning mining districts and gold-rush cities, the ranchero abandoned the hide and tallow trade for the more lucrative sale of beef. Gone—in a puff of gold fever, new statehood and a Land Commission suddenly responsible for allowing or disallowing Spanish and Mexican land grants—was the simple, undemanding life of the rancho. The reins of pacesetting were handed over to the new California phenomenon, the American businessman.

Sandy Snider is an assistant in the historical section at the Arboretum currently engaged in a research project on the life and times of the Gabrielino Indians.

A Landfill Botanic Garden

Armand Sarinana

THE ESTABLISHMENT of South Coast Botanic Garden over a sanitary landfill was one of the first such attempts in the Western Hemisphere. The garden was conceived as an outdoor botanic laboratory for the study of horticulture under landfill conditions in a diatomaceous earth medium. Therefore, problems in plant culture and soil engineering were expected. Solving them was the challenge.

The uniqueness of this challenge served to form a working partnership between the Sanitation District and the Department of Arboreta and Botanic Gardens, a partnership which continues to this day.

In the second half of the eighteenth century, Portuguese whalers made twice-yearly visits to this coastal area to capture the migrating gray whales. The nauseating odor of boiling whale blubber that arose from their iron kettles at Portuguese Bend and floated out over the Palos Verdes hills could have been an omen of the future. Certainly the odor disturbed the local Indian civilization as well as the new white settlers in the area.

Two centuries later the Sanitation District, trying to persuade local residents to accept a sanitary landfill, were faced with similar odorous gases, not to mention the sight of decaying garbage and the resultant flies.

The decomposition of refuse is always accompanied by the production of gases, mostly methane and carbon dioxide. Lower concentrations of the more noticeable odorous gases, or as they are specifically called, mercaptans, are also included as byproducts of this decomposition. This chemical process is accompanied by heat generation and increased pressures. The Arboreta Department's concern is primarily with the heat and pressures and the resulting soil subsidence and high soil temperatures.

The first problem anticipated was the possible pollution of the neighborhood with odorous gases. Previous laboratory studies had shown the efficiency of soil as a filtering agent, and field testing proved the odors generated within a fill would be effectively controlled by maintaining a soil cover on the surface. The lateral migration or movement of decomposition gases within and adjacent to the fill was controlled by the establishment of horizontal, gravel-filled collection basins with vertical upright exhausts. A constant program of inspection, maintenance, and monitoring is followed to assure continued control of odors and other landfill decomposition gases. The southern and eastern boundaries of the garden, which are adjacent to residential areas, are protected with this type of system.

Last July, the Sanitation District and the NGR Nu Fuel Company of Newport Beach concluded a joint study which had as its objective the feasibility of collecting, purifying, and selling methane gas created in a landfill. The 172-acre sanitary landfill across Crenshaw Boulevard from

South Coast Botanic Garden was their test site. The major problems centered around collecting and purifying the gas. The results of their study were positive and today the area, known officially as Landfill #1, has become very possibly the first facility in the world in which refuse gas is taken through a system that can pump it into a pipeline for direct sale to a utility company. The anticipated daily production is one million cubic feet of pure methane, an amount equal to the daily requirement for 4,000 homes. The two 100-foot wells in the garden were not established for commercial methane production but rather for the study of trash decomposition in the presence of moisture.

As previously mentioned, the Arboreta Department's main concern is the study and solution of plant growth in abnormal soil conditions. Areas of extreme soil temperatures, 120° to 160°, are localized in the garden; more general areas of lower temperatures are common throughout the garden with the average range 70° to 90°. The average home garden soil temperature in the vicinity of this facility averages between 55° to 70°. The same type of venting system used by the Sanitation District for odorous gases is used to vent these abnormal temperature areas where plant growth is initially impossible. Once soil temperatures are reduced, shallow-rooted plant material, such as gazanias or alyssum, is established. As temperatures continue to drop, deeper rooted perennials are introduced, such as carisa, junipers or cassias. The ultimate goal is to plant the deeper rooted trees and shrubs.

Characteristically, most established trees and large shrubs have lateral root systems limited to the three-foot top-soil cover. Therefore, the periods of greatest danger to these specimens are during the March winds when the soil is saturated from the winter rains and tree support is vital. Due to the higher temperatures in the lower trash decomposition zones with the maximum top soil cover of three feet, the development of deep root systems is impossible. These higher soil temperatures destroy or burn the new developing rootlets which must have cooler, tolerant temperatures.

In the localized zones of greatest gas, heat, and pressure activity, fissures serve as escape vents. Several main fissures transverse the garden and since soil temperatures are the highest at these escape vents all plant growth is impossible. These areas are therefore designated as study points of trash decomposition for the visitor. Differences in solid and fill land can also cause fissures, especially where great weight is involved. An example is the fissure that developed adjacent to the 1.75-acre artificial lake. The imbalance of the land in this particular area, coupled with a severe earthquake that occurred in February of 1971, caused the fissure which in turn caused the asphalt-jute waterproofing membrane on the bottom of the lake to rupture. The ensuing geological study by the County Engineers and Sanitation District resulted in the recommendation that the lake perimeter be reduced, thereby bringing in the lake margins over non-trash filled areas and away from the fissure zone.

The more common problems encountered are due to settling, or subsidence a problem of the completed landfill. Subsidence is caused by the variation in the density of debris deposited and its difference in decomposition rate. Interesting variations in terrain have resulted from this subsidence. An example is the spoon-shaped small lawn at the garden entrance which has become a favorite spot for photographers. The original terrain was almost level, with only the most necessary slope for drainage. As subsi-

These pictures show a large fissure at South Coast Botanic Garden and typical filling and venting. Top photo shows the fissure that developed from the pressure of escaping gas. Note that there is no plant life in the immediate vicinity. Second photo shows the fissure filled in and vented by plastic, perforated pipe. Third photo is simply a close-up view with a long-handled shovel thrust into the hole to indicate the depth of the fissure.

This photo shows the sinking of the land around the foundation of the current administration office. Because it was set on pilings, the office floor remained stable.

dence increased with added moisture, the center of the lawn sank approximately 24 inches. All lawn areas originally graded to a level terrain have developed graceful, moderate-sized depressions.

Because of the subsidence factor, all permanent building construction is forbidden unless built on pilings driven to the bedrock area. South Coast's current building and shop area were constructed on 40-foot pilings. This construction was generally effective insofar as the structures are concerned, but as can be seen in the picture, the land bordering the structures shows the results of more or less continuous subsidence. The new office-auditorium complex presently under construction will be located on the only solid one-acre area in the garden site.

The more common yet equally serious problem resulting from subsidence is the breakage of the sprinkler systems throughout the garden. The breakage is circumvented by the use of PVC, or polyvinyl plastic pipe, which has greater flexibility and is easy to repair. An effort to make this system more flexible and durable is under constant study.

The third problem due to subsidence at South Coast is drainage. Terraced areas must be corrected periodically to maintain the proper drainage necessary for successful horticulture. The accumulation of water accelerates settling, no doubt due to greater trash decomposition.

These are the problems that pose the horticultural challenge. Actually, many plants have adapted very well to this unusual environment. Except for areas having very high soil temperatures, all introduced plant material has survived the above-average soil temperatures, the subsidence, and the generally shallow root systems that result from the conditions. Overall, plant losses are less than one percent, a figure considered normal for the ordinary garden.

This is another in a series of articles by Armand Sarinana, superintendent of South Coast Botanic Garden, tracing the origin and development of that garden.

An Arboretum is for people . . .

Harvest time is a happy time for young people enrolled in the vegetable gardening classes at the Los Angeles State and County Arboretum in Arcadia. During the summer months they have planted and cared for their own vegetable plots, learning the basic facts of horticulture while preparing to take home the fruits of their labor.

This fall, the Education Division of the Los Angeles County Department of Arboreta and Botanic Gardens is offering many other educational opportunities for students of all ages. Schedules may be obtained by writing or calling Arboretum Education, 301 N. Baldwin Ave., Arcadia, CA. Telephone: 681-8411.

SCE

Southern California Edison Company

Gene Banks Need Deposits For Later Withdrawals

THE ORIGIN of many of our plants has been confused through the centuries by the intentional intervention and manipulation of plant people.

We have taken plants from the wild, cultivated them, crossed, recrossed interesting forms; and selected variants of the original for special uses. Through generations of selection, many new characteristics have been uncovered. When a significant change occurs, only then do plant people attempt to propagate the mutant plant—trying to preserve in its progeny the unique, new characteristics.

Since many of our plants are woody perennials, asexual propagation methods have become the major way to preserve the desired plant form. The genetic variability of seedling-grown material is too great to warrant the large scale growing of the progeny. Only annuals and a few other types are grown from seed.

The so-called warring between the exotic named and the hybrid coded cultivars must end. We must seek ways to conserve and preserve as many plant varieties as possible and take advantage of their potential characteristics. The collection, identification, preservation and redistribution of the vast range of plant material must create centers to maintain our gem- future generations a genetic base to create new plants.

We can never tell when a new strain of a disease will appear and threaten to wipe out all susceptible plants. We can expect that an introduced insect will find a new host range and wipe out entire clonal varieties of economic plants. We must create centers to maintain our germplasm pools. We must have every concerned plant person recognize plants occuring in our landscape which are new and useful variations of a well-known variety. Our plant societies must provide educational leadership.

The article on this page is an excerpt from an editorial writen by Dr. Henry M. Cathey, president of The American Horticultural Society, in the most recent issue of American Horticulturist, the Society's official publication. It is reprinted here through the courtesy of AHS and out of shared recognition of the aims of the Society's Plant Science Data Center to which Francis Ching, director of the Los Angeles County Arboreta and Botanic Gardens, was recently named a member.

We must urge responsible groups to maintain living collections of plants. This will mean that research funds must be aliotted to plant-keeping activities. In certain areas, the use of tissue and seed banks will help reduce expensive operations of maintaining vast fields of plant materials.

We must utilize the full resources of the Plant Sciences Data Center, located at the AHS River Farm Headquarters to accumulate information of the occurrence and germplasm potential of all kinds of plants. The concepts for the functioning of this facility have been greatly expanded to meet this pressing need.

GREVILLEA CV. POORINDA PETER (Cover)

Grevillea cv. Poorinda Peter is a handsome evergreen shrub that was brought back from Australia in 1971 by former Arboretum Superintendent George Spalding. The Australians have spent a great deal of effort in selecting fine cultivars from their choicest native plants and Grevillea cv. Poorinda Peter is one of the finer introductions among them.

It has an open growth habit to 6 feet or more in height. The evergreen leaves have 8 to 12 pairs of sharply pointed lobes (pinnately lobed). They are stalked, alternate, glabrous, thick, dull green when adult, reddish or brownish when young and up to 1 inch wide. Overall, the leaves resemble small, lobed, oak leaves, and the copper color found on new foliage and stems is one of the primary attractions of the plant.

Flower clusters are coral with a purple shading, particularly in the unopened buds. The flowers are conspicuous and are borne in good quantity in the late summer. Plants prefer well-drained soil in full sun but will likely adapt to many growing situations.

ARBORETUM WEATHER

Lat. 34°08'48" N.
Long. 118°02'59" W.
Elev. 571.28 ft.

Weather season:
Oct. 1 to Sept. 30

	May	June	July
Average daily maxiumum temperature	78.6	81.6	94.4
Average daily minimum temperature	50.8	54.7	60.3
Highest temperature	89	94	99
Lowest temperature	41	50	54
Number of clear days	18	7	15
Number of partly cloudy days	6	18	16
Number of cloudy days	7	6	0
Rain during this month	.21	.10	0
Total rain since Oct. 1st	14.98	15.08	15.08

Calendar

September, October, November, December

ARBORETUM, Arcadia

Sept. 19 — 6 p.m.
Queen Anne Frolic
Presented by California Arboretum Foundation for members and their guests.

Sept. 21 — 2 p.m.
Sunday Afternoon Lecture*
"Decorative Plants from Dinner Leftovers"
Tak Niiya, chief of Education Division

Sept. 28 — 10 a.m.
Sunday Morning Walk*
"Asiatic/North American Section"
Frank Simerly, assistant director

Oct. 4, 5 — 10 to 5 p.m.
Bonsai Show*
Presented by Akebono Bonsai Society

Oct. 5 — 10 a.m.
Sunday Morning Walk*
"Lawns and Ground Covers"
Charles Lee, horticultural consultant

Oct. 19 — 2 p.m.
Sunday Afternoon Lecture*
"Vegetable Gardening"
Ronald Call, education assistant

Oct. 24 — 8 p.m.
Theodore Payne Foundation Lecture**
"Hybridizing in Diplacus (Monkey Flower)"
David Verity, Botanist, Herbarium and Botanic Garden, UCLA

Nov. 8, 9 — 9 to 5 p.m.
Fall Mum Show*
Presented by Pasadena Horticultural Society

Nov. 15, 16 — 9 to 5 p.m.
Foothill Art Show*
Presented by Foothill Arts Society

Nov. 16 — 10 a.m.
Sunday Morning Walk*
"Greenhouses"
Tim Lorman, horticulturist

Nov. 16 — 2 p.m.
Sunday Afternoon Lecture*
"Shade Plants"
John Provine, superintendent

Nov. 22-30 — 9 to 5 p.m.
FOTA exhibit
Presented by California Arboretum Foundation

Dec. 13, 14 — 9 to 5 p.m.
Camellia Show*
Presented by Southern California Camellia Council, Ltd.

*Sponsored by California Arboretum Foundation

DESCANSO GARDENS, La Canada

Sept. 27, 28 — Sat. 12 to 5 p.m.
Sun. 8 to 5 p.m.
Bonsai Show*
Presented by Descanso Bonsai Society

Oct. 25, 26 — 9 to 5 p.m.
Chrysanthemum Show*
Presented by Glendale Chrysanthemum Society

Nov. 14 — 8 p.m.
Theodore Payne Foundation Lecture**
"Basic California Flora"
Helen Carswell, master rose consultant and naturalist

Dec. 5 — 1 to 4 p.m.
Red Carpet Tea (members only)
Christmas Decorations Exhibit*

Dec. 6-14 — 9:30 to 4:30 p.m.
Christmas Decorations Exhibit
Presented by Descanso Gardens Guild

*Sponsored by Descanso Gardens Guild

SOUTH COAST BOTANIC GARDEN PALOS VERDES PENINSULA

Sept. 4, 5, 6 — 9 to 4 p.m.
Costa Verde District Garden Clubs Flower Show Judging Course
Presented by Costa Verde District Garden Clubs.

Sept. 28 — 2 p.m.
Sunday Afternoon Lecture*
"Outdoor Container Gardening"
Edward Hartnagel, assistant superintendent

Oct. 10 — 8 p.m.
Theodore Payne Foundation Lecture**
"California Natives in Canyons"
Mrs. Roy Fetterman, photographer, conservationist

Oct. 19 — 10 a.m.
Sunday Morning Walk*
"Aquatic Section"
Edward Hartnagel, assistant superintendent

Dec. 21-27 — 9 to 5 p.m.
"Open House and Christmas Exhibit"*

*Sponsored by South Coast Botanic Garden Foundation

**Presented in cooperation with the Department of Arboreta and Botanic Gardens

BIRDWALKS

ARBORETUM
1st Sunday of each month at 8 a.m.

DESCANSO
2nd and 4th Sunday of each month at 8 a.m.
Sponsored by San Fernando Audubon Society

SOUTH COAST
3rd Wednesday of each month at 8 a.m.
Sponsored by South Coast Botanic Garden Foundation

Lasca Leaves

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LOS ANGELES STATE & COUNTY ARBORETUM

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Donald S. Dimond

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Department notes

Proposed Hall of Environmental Education.

FUND RAISING FOR A CAUSE

ALTHOUGH these would hardly be rated the best of times for raising money, irrespective of the cause, the appeal for funds to construct a "Hall of Environmental Education" at the Arboretum has already brought an amazing response, beginning with the Queen Anne Frolic last September, which marked the start of the campaign and netted nearly $5,000, and continuing with donations totaling almost $50,000 in the following six-week period. This start toward the California Arboretum Foundation's pledge to raise half a million dollars for this Hall makes it clear that people have a way of responding to projects meaningful to them no matter what the economic conditions of the day.

The Council of Advisors supervising the fund-raising effort has devised an attractive and sensible breakdown of contr

ponent parts of the Hall that will enable large and small donors, organizations and individuals, to contribute and receive recognition for their own segment of the building. Thus, an auditorium is tabbed at $250,000, classrooms are $50,000 each, a covered patio costs $25,000, a seminar room $60,000, all round figures, of course. Additionally, there are plaques at $15,000 for miscellaneous elements and donor's plaques for $1,000 and over. The ball is rolling now, everybody is invited to join! A more worthwhile source of tax deductions would be hard to imagine.

QUEEN ANNE FROLIC

THE QUEEN ANNE Frolic last September 19 was enjoyed by 800 members of the California Arboretum and their guests. The weather was perfect, as it has been for each of these biennial affairs, thereby making the paddleboat and vintage car rides particularly enjoyable. People danced until curfew time to the music of Dexter Jones and his orchestra after partaking earlier in the evening of Director Francis Ching's barbecued roast beef, admirably carved and served by a brigade of Arboretum personnel led by Calvin Allen. There was hardly anybody on the staff and among the volunteers who did not contribute in some way to the success of the Frolic, but deserving of special mention are these members of Las Voluntarias: Jane Buck, who chaired the event; Ruth Mary Larson, food; Peggy Dorsett, raffle; Helen Crawford, script; Marilyn Llewellyn, reservations; Eileen Hume, entry gate; Marilyn Bochte, Queen Anne tours; Pat Copley, publicity; Nancy Cole, entertainment; Frances Burnett, refreshments; Karen Alexander, cleanup; and Mitzi Moore, Las Voluntarias president who assisted with the food; and Tootie Grivich, Foundation president, who handled the fund-raising kickoff for the

Mrs. Samuel Ayres, Jr., with Mrs. Jeanne Trepanier whose husband, Bob, brought a number of vintage bicycles and tricycles from his famous collection to the delight of Queen Anne Frolickers.

Hall of Environmental Education. On the staff side, superintendent John Provine was very much in evidence before, during, and after. The winner of the two roundtrip raffle tickets to Hawaii was Phyllis Chapman, active member of Las Voluntarias, who is planning with her husband to make the trip during the coming Easter vacation.

MRS. JOHN R. MAGE HONORED

A FAITHFUL supporter of the Arboretum for nearly a quarter of a century has been honored by the Garden Club of America Conservation Committee "In recognition of her dedicated efforts and her many contributions to the preservation and restoration of historic- tury has been honored by the Garden fornia." Mrs. John R. Mage was co-

chairman with the late Susanna Dakin of the Historical Committee of the California Arboretum Foundation. She played a key role in obtaining funds for the restoration of the Queen Anne Cottage, the Coach Barn, Boat House, and Hugo Reid Adobe, and over the years has contributed directly and indirectly to many of the most prized furnishings in the Cottage. An original member of the Arboretum's Board of Councilors, a member of the Foundation's Board of Trustees since 1955, and a member of the Board of Governors for twenty years, she retains, as a confirmed history buff, her interest in and support of the objectives of the Committee. It is a particular pleasure to report the honor given her by the Club.

DEPARTMENT AWARD

THE NATIONAL Association of Counties has presented an Achievement Award to this Department for its public service programs. Supervisor James Hayes accepted the award on behalf of the Department at the NACO convention in Hawaii last July. In the case study required of all award applicants, the Department based its presentation on its underlying philosophy, "The Arboretum is for People," and translated into practice by programs geared to serving the day-to-day needs and interests of the public. Examples cited were the Arbor Day program, which in reaching a thousand schools throughout Los Angeles County provided nearly a half million students with classroom study materials that would bring them a deeper understanding of their natural environment and the need for conservation; the annual Spring Extravaganza (horticultural field trips), which attracted 25,000 people on a single weekend who saw displays and demonstrations on just about every horticultural topic; Sunday lectures and walks, a program that brings in-depth examination of plant collections to visitors and practical guidelines for home gardeners; a horticultural information service that answers hundreds of inquiries each week; and a series of booklets and bulletins dealing with such public-interest topics as brushfire control, poisonous plants, fungus disease, and insecticides. The award, in the form of an attractive plaque, was one of twelve won by Los Angeles County in the annual competition sponsored by NACO.

CHRISTMAS DISPLAYS

THIS YEAR, Christmas displays at the Arboretum are centered in the Queen Anne Cottage and the rotunda at the entrance. The Cottage has traditionally been decorated in typical turn-of-the-century style and will be again this year, making use, as always, of as much living plant material as possible. In the rotunda visitors will see a poinsettia tree made up of about fifty individual plants—a project they may wish to duplicate at home—hanging baskets of Christmas foliage, and floral arrangements using flowers available from Southern California gardens at this time of the year. One of the display cases in the rotunda will contain toys and postcards from the first decades of the century, the other a display of traditional wreaths.

From December 21 through the 25th at South Coast (except Christmas day) an "Open House and Christmas Exhibit" is scheduled at the building variously known as the Club House or Information Center. In any case, with the new administrative complex practically finished, this will be the last year that that building will be so used. At this writing, plans are for traditional displays utilizing, insofar as possible, cuttings from the gardens, pinetum and other Christmas-plant sections.

Dr. David Deardorff and Dr. Gary Wallace.

APPOINTMENTS

TWO BIOLOGISTS have been appointed to the staff of the Department's Research Division, Dr. Gary Dean Wallace, a resident of Arcadia who earned his doctorate in botany in 1974 at Claremont Graduate School, and Dr. David Charles Deardorff, a native of Washington who received his doctorate in botany this year from the University of Washington. The background and special interests of both men are expected to strengthen greatly the Department's plant introduction and collection programs.

Dr. Wallace has a special interest in taxonomy in its broader aspects, one which includes such considerations as evolutionary phenomena, geography, and plant anatomy, particularly in relation to ecological distribution. Dr. Deardorff has similar areas of interest. His college major was in plant taxonomy and part of his professional experience has been as a teaching assistant at the University of Washington in general biology and plant taxonomy classes with considerable activity in leading field trips and in the collection of plant material.

In their work in the Department, Doctors Wallace and Deardorff will have among their longterm objectives the making of botanical assessments of the plant collections with the view of completing the collections of genera having a potential for use in the Los Angeles area. The public good from this objective will be the introduction of more ornamental plants to the Southern California landscape. The testing and introduction of plants from different parts of the world has, of course, been a major function of the Department. In 18 years, over 60 plant introductions have greatly contributed to making Los Angeles one of the most colorful and

beautiful cities in the United States. In many cases there have also been practical advantages through low-maintenance ground covers and through the use of special plants for erosion control and for limiting fires.

CAMELLIA SHOWS

DESCANSO GARDENS and the Arboretum will be the scenes of three camellia shows within a period of less than three months, shows that will cover most of the varieties and just about every horticultural aspect of this highly popular genus. Although there are already several thousand named varieties of camellias, there is still a great potential for hybrids in a wider range of colors and sizes, a potential which diligent breeders are making inroads on each year.

The difference among the forthcoming shows is more than a matter of locales. In the world of camellias, there are early, mid-season, and late bloomers. And then there are mid-season and late bloomers that bloom ahead of their normal time as a result of being treated with the growth hormone, gibberellic acid. The first show of the season, presented by the Temple City Camellia Society at the Arboretum on the weekend of December 13 and 14, will be primarily for "gibbed" camellia blooms and will include demonstrations of the technique involved. The second show of the season, also at the Arboretum, will offer a conventional, full-scale competition over the weekend of February 14 and 15. Arthur Krumm, a longtime camellia fancier from Temple City, is the chairman of both shows. The third show will be presented at Descanso Gardens on Saturday and Sunday, February 28 and 29, by the Southern California Camellia Council. The Descanso show is not only the major flower show of the year at that garden, it is also one of the major floral events in the country. Melvin Gum, president of the 20-year-old Council, reports that visitors can expect to see in cut-flower form three to four thousand varieties plus, of course, the 100,000-odd bushes that make up the Descanso camellia forest which will be at peak flower at that time. Regular features of the show will include question-and-answer booths, demonstrations of propagation by grafting, and displays of new hybrids and seedlings.

NEW DESCANSO SERVICES

THE DESCANCO Gardens Guild has planned two new public services for 1976 aimed, as are all Guild activities, at familiarizing greater numbers of people with the virtues of the Gardens. The first is "A Day At Descanso," offered each Tuesday during the first six months of 1976. For $7.50 a visitor will receive a tram tour, a catered luncheon in the Hospitality House, and an illustrated lecture on the history of Descanso and its environs. The four-and-three-quarter-hour program starts at 10:45 a.m. and is limited to a minimum of 25 persons and a maximum of 80. Garden clubs, senior citizens and other interested groups are invited to call the Guild office (790-5414) for reservations and further information.

The second service will provide visitors to the Hospitality House with a Guild-manned information desk on week days from 11 a.m. to 4 p.m. In addition, two other volunteers will staff the new gift shop just off the Gun Room that will offer a variety of garden-oriented items selected during the past summer by Guild member Mrs. Claude Bartlett. On Saturdays and Sundays similar items may be purchased from the Pink Cart near the Gate House from 1 to 4 p.m. Staffing coordinators for both the House and the Cart, Miss Helen Burr and Miss Dorothy Lewis, will welcome new volunteers.

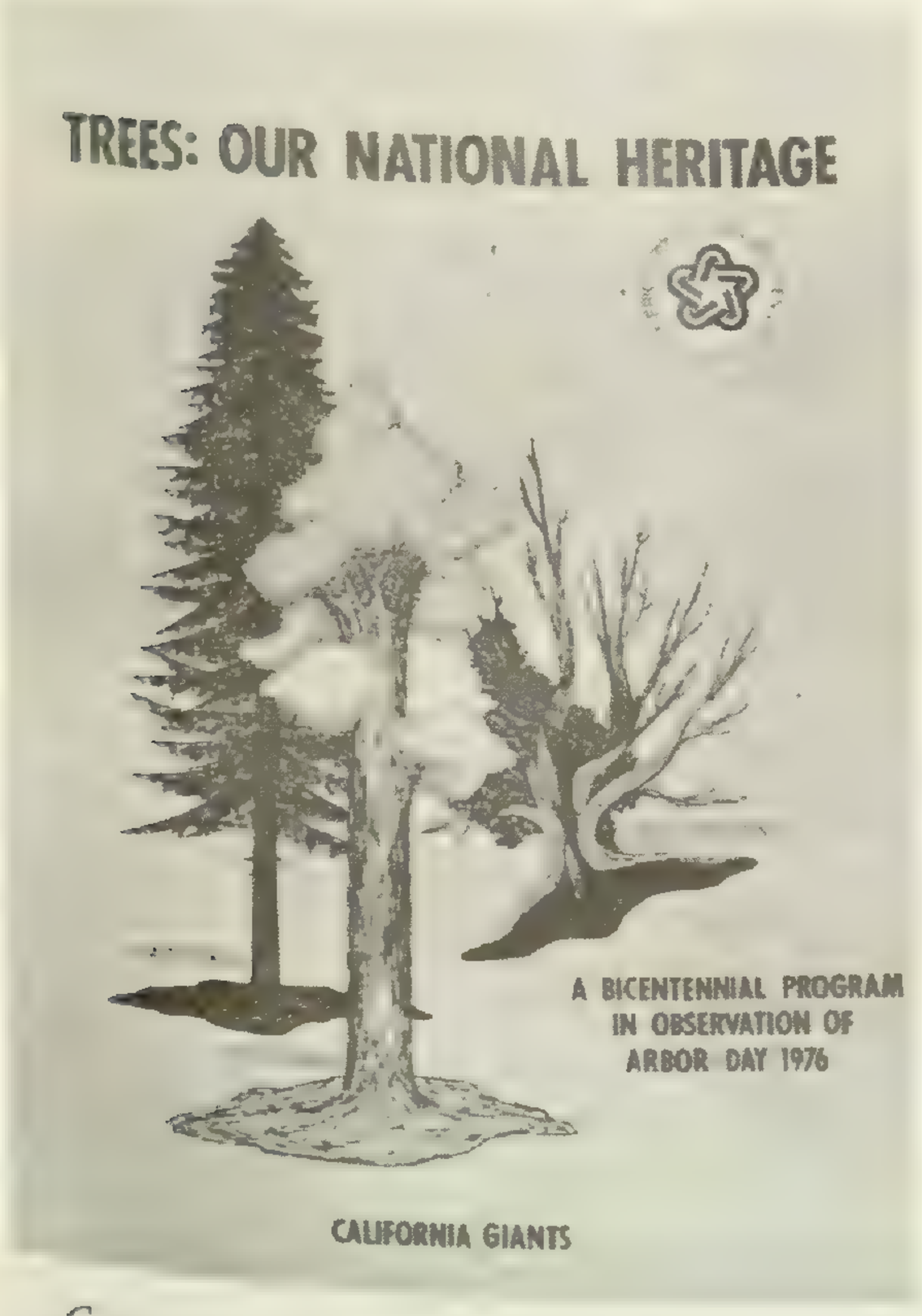
ARBOR DAY

THE LOS ANGELES County Department of Arboreta and Botanic Garden's Arbor Day program on March 7, 1976, has been named an official Bicentennial Program by the County Bicentennial Commission and the Board of Supervisors. Under the theme "Trees: Our National Heritage," the Education Division of the Department has prepared the most ambitious and wide-reaching program in its 20 years of advancing the concepts of Arbor Day—conservation and tree-planting—throughout the community.

An important feature of the program is an information packet containing valuable resource material tracing the role of trees in the building of the nation and illustrated by life-like pen-and-ink drawings by well known local artists. The packets are intended to provide the basis for yearlong classroom study aimed at cultivating student interest in environmental and conservation matters. Their attention will focus on the indispensable role trees have played in the nation's development, among them the white oak, used in shipbuilding; the sugar maple, used for making furniture and for its syrup; the eastern white pine, used for ships' masts; the shagbark hickory, used for covered wagons; the Douglas fir for telephone poles; and the western hemlock for paper products.

California's most famous contributions to the nation's heritage of trees are the two great redwoods: *Sequoia sempervirens,* tallest of the world's trees, and *Sequoiadendron giganteum,* the most massive in the world; and the best specimens of the oldest living trees in the world, the bristlecone pine (*Pinus aristata*), known to reach an age of 4,900 years.

As many as 500,000 children from 2,000 county schools and youth organizations are expected to participate in the Bicentennial-Arbor Day program throughout the County which will include the planting of two thousand 7-foot living trees carefully nurtured at the Arboretum for this Bicentennial observance. The Department has been growing the trees and assembling the packets for the program for the past year, assisted by Chairman Marilyn Llewelyn of the Volunteers of the California Arboretum Foundation and by a donation from the Oak Tree Foundation. As an added touch to stress the value of trees to the country, each of the trees to be planted will be tagged with a red-white-and-blue label giving both its popular and scientific name and appropriately designated as part of the official Bicentennial-Arbor Day program.



Cover of Department's Arbor Day packet.

Baldwin Bonanza VI

A
Special Preview Night for
Members and their Guests
(Reservations Required)

Saturday, April 3 5 to 8 p.m.

All proceeds from this once-a-year special plant sale will go towards construction of the Hall of Environmental Education.

Featured will be:

Arboretum Plant Introductions
Plant Sculptures
House Plants
Hanging Baskets
Kitchen Herbs
Craft Items

And a special selection of CYCADS from the collection of Mr. Loran Whitelock.

Plant Portrait . . .

Coast Redwood

Leonid Enari

IN HIS ARTICLE, "Finding the Mt. Everest of All Living Things," in the July 1964 issue of the National Geographic, Dr. Paul A. Zahl describes the discovery of a new world's tallest tree, a coast redwood. He tells how, in October 1963, he came to towering trees along Redwood Creek in the northwestern part of California's Humboldt County, how he measured the seemingly tallest tree in the grove, how his computations resulted in 370 feet, how he had doubts about the accuracy of his computations, and how he finally hired professional surveyors to check his figure. He was right. When three surveyors a few days later finished their work, their computations completely changed the tree world's hall of fame. The four tallest trees in the grove, as attested by the surveyors' jointly signed statement, showed heights of 367.8 feet, 367.4 feet, 364.5 feet, and 352.3 feet. This ranked them as the first, second, third, and sixth tallest trees in the world. The height of a coast redwood in Rockefeller Forest, thought so far to be the world's tallest, is only 356.5 feet, ranking it now as the fourth.

Sequoia sempervirens at Arboretum.

The principal home of the coast redwood lies in a narrow belt ten to thirty miles wide along the coast of the Pacific from Curry County in the southwest corner of Oregon to Monterey County in California. The area is distinguished by frequent fogs in summer, heavy rainfall in winter, and mildness of temperatures. In Humboldt and Del Norte Counties, where the fogs are thickest and the rains heaviest, the coast redwood forests are the mightiest.

Throughout its range, the coast redwood is commonly the dominating tree. On the flats and river banks, it forms nearly pure stands, crowding out all other species. On the slopes, it is usually associated with Douglas fir, lowland fir, western hemlock, tanbark oak and madrone. As the redwood slopes are relatively open, there is a dense undergrowth of salal, huckleberries, Oregon grapes, thimbleberry, salmonberry, rhododendrons, ferns and others. Even poison oak has found places to grow, clinging to the bark of trees and climbing from 50 to 150 feet.

The coast redwood (*Sequoia sempervirens*) typically has a straight, tapered bole that rises clear for more than a hundred feet and a crown of horizontal branches that may occupy from a third to a half of its total length. This, however, is not always its common form. In old forests, the crown may consist of a few long, flat limbs, or of a mass of little branches reaching from the ground to the top of the tree.

The wood is clear red-brown in color.

Grove of coast redwoods at Descanso Gardens.

soft, brittle, strong, and most important, extraordinarily resistant to rot and insects, qualities possessed in like measure by few other woods, not even that of the Big Tree of the Sierras. It is used for construction, finishing, shingles, railroad ties, telephone poles, and many other things. The chief difficulty in working redwood lies in the seasoning process. The tree absorbs so much moisture that the butt log will sink in water. Left in the sun, logs require three to four years to dry.

The leaves are flat, sharp-pointed, stiff, of unequal lengths on the same twig, and measure from one-third to about one inch. The foliage is of a bright, deep yellow-green. Each season's growth remains on the tree for about three or four years.

Cones are small as compared to the size of the tree. They mature in one year and open and shed their seeds starting in September.

The redwood forest is of the selection type; that is, it contains trees of widely varying ages and keeps itself stocked by production under its own shade from seeds and suckers. As the seed requires more light to germinate and grow than the forest usually affords, the stands are chiefly maintained by suckering from old trees. The suckers manage to survive year after year by connection with their parents and to make a slight increment of wood. When the old trees are felled, more light is let in and the suckers shoot up with all their native vigor. They will endure a astonishing amount of shade. In stands of second growth, so dense that not a ray of sunlight can enter, saplings 6- to 8-feet high can be found growing from stumps. bare of branches or foliage except for a few inches of pale-green crown at the top. In very dark, damp places in the virgin forest one may find clumps of suckers as white as sprouts from a potato in a cellar.

The enemies of the coast redwood are

SEQUOIA SEMPERVIRENS

Branch of coast redwood. (Drawing by Patty Lawson)

few and it suffers from these less than other trees. Wind can only rarely uproot them, and fire, the greatest enemy of all trees, though it may kill whole stands of young growth, is unable to penetrate the fireproof sheathing of shaggy bark with which the old trees protect themselves. In the damp northern part of the redwood belt the forest is too wet to burn. Farther south, during August and September when the land is dry from lack of rain, fires are frequent. Even then, however, unless the conditions are exceptional, they seldom are a threat to the old coast redwoods.

The coast redwood was first reported by Fray Juan Crespi, the chronicler of the Portola expedition which had been sent from New Spain (Mexico) to establish missions in what was then called Upper California. In the diary of the expedition, he mentions that on October 16, 1769, the expedition traveled over plains and low hills, well-forested with very high trees of a red color, and that because none of the expedition recognized them, they were named redwoods.

Specimens of a coast redwood tree were taken to England in 1795 by Archibald Menzies, a surgeon and botanist of the Vancouver expedition. When Aylmer Bourke Lambert, an English botanist, finally examined them in 1823, he placed the new species into the genus *Taxodium* and called it *Taxodium sempervirens*. The name, however, was changed by Stephan Endlicher, an Austrian botanist who in 1847 decided that the tree named by Lambert represented a genus distinct from *Taxodium*. He gave it the genus name *Sequoia* but retained Lambert's species name. It is stated that Endlicher chose the generic name *Sequoia* to honor Sequoiah, the son of a Cherokee woman by a German colonist, who invented a Cherokee alphabet and taught many of his people to read and write their own language.

The National Park Service estimates that of two million virgin acres of coast redwoods, only 15 percent is left. And of these 300,000 acres, only about 50,000 acres lie within public parks and groves. At the present rate of logging, all the available virgin growth may be cut in half in the next fifty years. It seems like the danger of losing this forest, which was old when the world was young, is coming closer and closer. To replace it will take hundreds if not thousands of years.

Entering into a virgin coast redwood forest is an unsurpassed experience. It is a world of darkness, silence, and tranquility where time has no meaning and where one feels the closeness of the Creator. The impact is almost spiritual, for believers and for nonbelievers alike.

Coast redwoods can be successfully grown in many areas outside of their natural range. One of the best growing places is in, or directly next to, a lawn. Away from lawns, the trees need regular summer watering at least for the first five years.

At the Los Angeles State and County Arboretum, coast redwoods are found in quadrants N/7, N/8, N/9, and N/13. The largest specimen is in quadrant N/9 (east of the Coach Barn). It is 148 feet high and its three trunks measure 9'3", 8'6", and 6'4" in circumference. A fourth trunk was cut off some time ago. This tree is believed to have been planted by E. J. Baldwin in the 1880's. Coast redwoods can also be observed at Descanso Gardens in La Canada and South Coast Botanic Garden on Palos Verdes Peninsula.

Dr. Enari, author of this series of articles on plants at the Arboretum, is a senior biologist in the Department's research division, taxonomist, chemist, teacher, and author of a number of textbooks on botany.

Prehistoric and Jungle Garden

Walter Ransom

NORTH OF the lagoon lies a confusing and tangled plant community popularly referred to as the Arboretum's "jungle" area. Recently developed and enlarged to protect resident plant and wildlife, the Prehistoric and Jungle Garden also offers an exclusive look at plants from the past. This extensive collection of over 300 different prehistoric plants surrounds the newly constructed observation platform, a facility which offers informative displays on various aspects of plant evolution and its relationship to mankind. The Arboretum's theme of "Plants and Man" underscores the newest development, the Prehistoric and Jungle Garden. These ancient plants, their history of development or failure, outline the successful and unsuccessful environments of the past. This information may be used by all to help guide man's fluctuating respect for his own vital and precariously balanced environment. Essentially, the new garden is an attempt to illustrate ongoing elements of change and how well plants adapted to this phenomenon or, somehow, escaped from it.

From fungi to flowers, plants have increased dramatically in their structural complexity over a period of two billion years, a slow and gradual process called evolution. The first land plants probably

evolved from seaweeds growing along the shoreline over 425 million years ago. Gradually establishing themselves within the tidal zone, these primitive seaweeds eventually adapted to the periodic recession of water before the slow migration inland. Other early land plants may have emerged from great inland basins. As these freshwater basins slowly dried out, the enduring plant forms were forced to either develop roots or perish. Once on land, vegetation apparently exploded. This was the Paleozoic era, a period of time which began over 500 million years ago and lasted for about 300 million years. Generally this was an age of transition, of violent geologic and climatic disturbances which ended only with the coal age. Many of the Prehistoric Garden's specimens first evolved during this period. Dense jungles of gigantic clubmosses, horsetail, tree ferns and ground ferns flourished in endless jungles. Later, more advanced cycads, dawn redwoods and maidenhair trees emerged, all vying for space and sunlight.

What caused this gradual process of evolution? Why did some survive and others perish? There are several factors but many agree that the Ice Age was among the most important elements which encouraged plant development. Caused by natural variations in the earth's orbit, glaciers have periodically developed, advanced, and retreated throughout earth's long history. Once the world was much warmer than it is now. At that time vast jungles covered much of the world's surface areas. The appearance of large scale glaciation pushed the world's prehistoric jungle areas south, toward the warmer equator. Plant life which followed the Ice Age retreat was complicated enough to resist a series of four glacial advances. Fortunately, due to geological factors, some prehistoric and ancient plants escaped the ravages in the Age of Ice.

Remnants from these ancient jungles that survived have been collected by the Arboretum and are on exhibit in the Prehistoric Garden. Representatives such as the cycads, with a lineage in excess of 280 million years, dominate one area, while maidenhair trees, giant redwoods, swamp cypresses, dawn redwoods, and other primordial specimens are circled about. Nearby, displays of horsetail (*Equisetum*) and clubmoss (*Lycopodium*) are veiled in the cool shade. Bizarre plants, they have endured over 145 million years, surviving eons of change and evolution. An equally primitive gathering of ferns (*Filicales*) surround the observation platform and add to the air of prehistory. From the observation deck, a one-way path will guide the visitor through the Prehistoric Garden, returning only for a comfortable stroll under the Jungle Garden's thick, sometimes impenetrable vegetative canopy.

Plant communities are defined by man, not by nature, and plants seldom follow the rather rigid limitations set down by man; however the jungle area fits a riparian plant community. A unique woodland to be sure, the "Jungle" is comprised of a wide variety of water-loving vines, shrubs, and trees from all over the world. Dominant plants in the Jungle Garden include palms from Mexico, our own magnolias, Asian bamboo, eucalyptus from Australia, swamp cypress from Florida, sweetspire from China, native wild grape, Japanese honeysuckle, cattail, catalpa from the Midwest, and the black walnut. Riparian plant communities, or stream-side (spring-side) vegetation are often rampant in growth. Some of the temptation to refer to it as a tropical rainforest is inspired by its jungle-like appearance, especially in the warmer months of summer, when wild grape, bamboo, and honeysuckle hang in thick green curtains reminiscent of the lianas in rainforest clearings. Unless one follows the trail, movement is restricted by an al-

most impenetrable wall of plant life throughout the Jungle Garden. Not only are the trees so crowded that intertwined foliage restricts vision, but also the underlays are hopeless tangles of fallen limbs and other debris, saplings, dogwood, and wild grape. By definition, the Arboretum's "Jungle" is a riparian plant community and not a tropical rainforest, yet obvious similarities do allow comparison.

While the Arboretum's Jungle provides a showcase for ancient and recent plants, rainforests of the world remain the most ancient of all plant organizations. Tropical rainforests represent the purest form of plant development under ideal condi-

Observation deck containing exhibits.

View across Lasca Lagoon from observation deck.

tions. A prehistoric plant organization, rainforests flourished as far north as Canada and Greenland during the coal age, 300 milion years ago. Later, in the face of advancing glaciers, these massive plant groups retreated south, leaving the more adaptable temperate vegetation to the whims of seasonal sun and snow. Now restricted mainly to 10° north and south of the equator, a constant and stable supply of moisture and heat supports the rainforests. The remarkable feature of these ancient forests is the concentration of so much plant life in such a small area. In the Brazilian rainforests, there are as many as 300 species of trees occurring in a square mile. Some believe this intense growth is yet another explanation for plant variation and evolution. The numbers are so many that naturally occurring and successful genetic mutations may develop. As an ecosystem, the tropical rain-

Path through "jungle."

forest represents an ancient plant organization which, by virtue of its environment, is the most productive of all plant communities, yet is also, as an ecosystem, very sensitive to man and his pollution.

Plants and man do not live apart from one another, rather in association with each other. This organized, machine-like community of plants and animals, together with the environment that influences their development, is an ecosystem. Ecosystems can be of any size from a jar of simple and primitive algae to the most complex tropical rainforest. Whatever the size, an ecosystem operates as a whole unit, one which is very sensitive to the quality of its environment.

Man, unique among other animals has been carried outside the natural laws and boundaries of his own ecosystem by his own ingenuity. Man alone has the ability to preserve, alter, or waste entire ecosystems. In his fascination with the "struggle for existence," and survival of the "fittest," mankind may have ignored his environment to a fault. Not enough people realize that mutual cooperation between different kinds of organisms—symbiosis—is just as important, and the "fittest" may not be the strongest, but rather the most adaptable and cooperative. What we do to our air, water, and soil and how this might change our environment can be considered against the backdrop of the Arboretum's Prehistoric and Jungle Garden.

Walter Ransom is a student professional worker who has been doing research on the Prehistoric and Jungle Garden project for the past year.

A Plant for A Contained Atmosphere

John Provine

EARLY in the nineteenth century, Dr. Nathaniel Ward, an English botanist, discovered plants growing in a few sealed bottles stored in his basement. This discovery led to his experimenting in shipping plants across the sea in glass cases which eventually became known as Wardian cases, our first terrariums. Most people now think of a terrarium as a landscape in a glass container while single plants in a glass container are referred to as growing in a contained atmosphere.

The subject of this series of articles deals with selected plants especially adapted for use in a contained atmosphere.

One of the nicest and easiest to grow is *Begonia prismatocarpa* — prismatocarpa meaning prism-fruited. *Begonia prismatocarpa* is an epiphyte which was first found growing on rocks and trees on the small island of Fernando Po off the coast of West Africa at an elevation of 3,000 feet. It was discovered by Gustov Mann and was first published in Curtis' Botanical Magazine of 1862 Vol. 18. *Begonia prismatocarpa* became very popular in California as a plant for a contained atmosphere in the early 1970's because it is a compact plant requiring a small sized container, almost ever-blooming, and requires little care. The compact plant grows to a height of about two inches and spreads slowly with new rhizomes filling the bowl nicely. The stems or rhizomes are herbaceous, rounded and hairy. The hairy leaves are green from one-half inch to two inches long with long petioles. The great abundance of yellowish-orange flowers, most of the year, is what makes this such a desirable plant to have.

Steps in growing *Begonia prismatocarpa* in a contained atmosphere:

1. Select a clear glass or plastic bowl 10-inch or larger.
2. Clean the bowl thoroughly with detergent and rinse with bottle water.
3. Cover the bottom of the container with chips of charcoal to allow for drainage.
4. Add moist growing mix. The Arboretum prefers a soilless mix of one half peat moss and one half perlite. This is a light-growing mix and will allow for necessary drying. Remember this plant is an epiphyte so about one inch of growing mix is needed.
5. Plant begonia in the growing mix.
6. Cover your container with a lid or Stretch 'n Seal.
7. Selecting a place in the home or office is one of the most important steps. Without the proper light, the plants will not bloom. *Begonia prismatocarpa* needs lots of light but not direct sunlight. If the plant is not blooming and is stretching, it may not be getting enough light.
8. Another very important step is watering. As the container lacks

The small size of Begonia prismatocarpa *as shown in this photograph demonstrates the need to grow it in a compact area.*

Begonia prismatocarpa *in a terrarium, the cover temporarily removed.*

drainage, distilled water should always be used. A baster should be used by pointing the open end against the glass so that the water will run down the inside of the container thereby preventing water on the foliage and splashing the soil on the sides of the container.

Let the water set, so the growing mix can soak up the water, then tilt the container slightly and take the baster and pull off the excess water. Cover the container.

The Arboretum's soil mixture will turn a lighter color when the growing mix is dry. Also, when the leaves turn silverish in color, the mix has become too dry. On hot days as the temperature of the house or office gets warmer, the temperature inside the bowl will likewise get warmer. To correct this, pull back the lid to allow the temperature to adjust. This is the same as opening a greenhouse vent.

Begonia prismatocarpa can be easily started by obtaining a leaf from a friend, as they root very easily. Plants are available at the Arboretum's Gift Shop, although the supply is limited. Nurseries that specialize in begonias carry them or you are able to get one at the yearly Baldwin Bonanza.

John Provine, Arboretum superintendent, has specialized in container planting for many years.

Rancho Santa Anita . . .

The Trials of Ownership

Sandy Snider

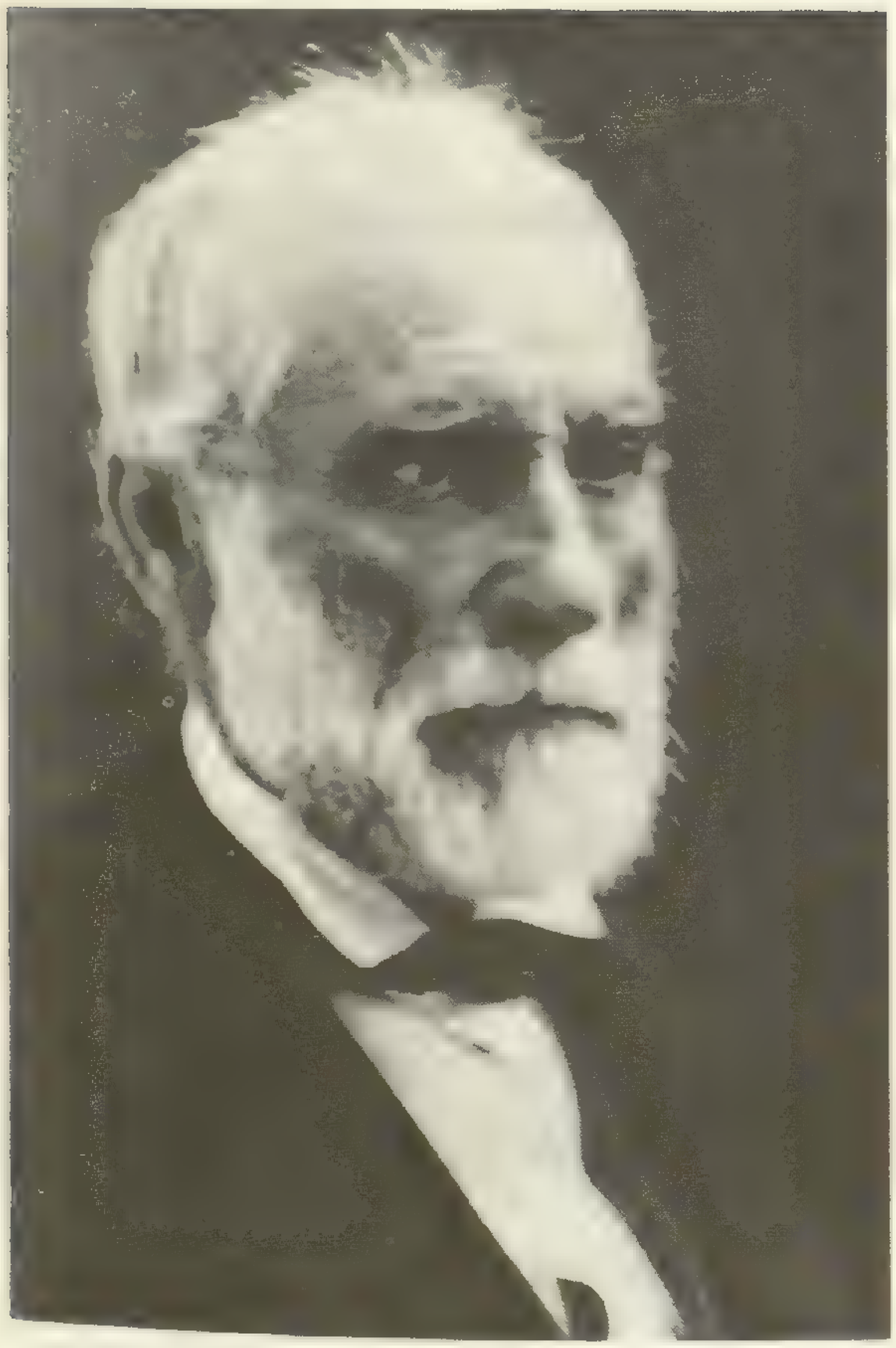
RANCHO SANTA ANITA, occupied in part by today's Los Angeles State and County Arboretum, has over the years justly earned its reference as the "fairy spot of the Valley." Appreciated and coveted since primitive time, the rancho peaked under the ownership of Hugo Reid when hides and tallow furnished a stable economic base and fine mission plantings flourished in a benevolent climate. Fields of grain, orchards, and vineyards marked Reid's improvement of the land as he unabashedly courted the favor of Governor Pio Pico for official title to the rancho.

Scarcely two years after he received full title (1845), however, the quixotic Reid found himself tired of life as a ranchero and on the brink of insolvency. Rancho Santa Anita was offered for sale at twenty cents an acre ($2,700) and was purchased by Reid's friend and Rancho Azusa neighbor, Henry Dalton. In an earlier reference to mission secularization, Reid had written that "destruction came as a thief in the night." So, too, ironically, did destruction come not only to Hugo Reid, who died a broken and humbled man a short five years later, but also to the lovely Rancho Santa Anita itself.

During the ensuing decade and a half, absentee ownership and mismanagement combined with political, economic, and even climatic reserves to cloud the future of the Valley's "fairy spot." Transition is rarely easy, and California during the 1850's and early 1860's was the scene of rapid change. The discovery of gold in California and the subsequent transition from Mexican to American ways was but the tip of the iceberg. Below the surface, the demise of the hide and tallow trade in the face of "gold-induced" inflationary beef prices, endless litigation to settle the validity of Spanish and Mexican land grants, and, later, an unprecedented two-year drought in which thousands of cattle perished and the prices of land slumped, all contributed to make instability a way of life.

During this trying period, title to Rancho Santa Anita passed through a number of hands. Successive owners, despite their personal strengths and weaknesses, were subjected to the rigors of transition, and, often, the land itself paid the price.

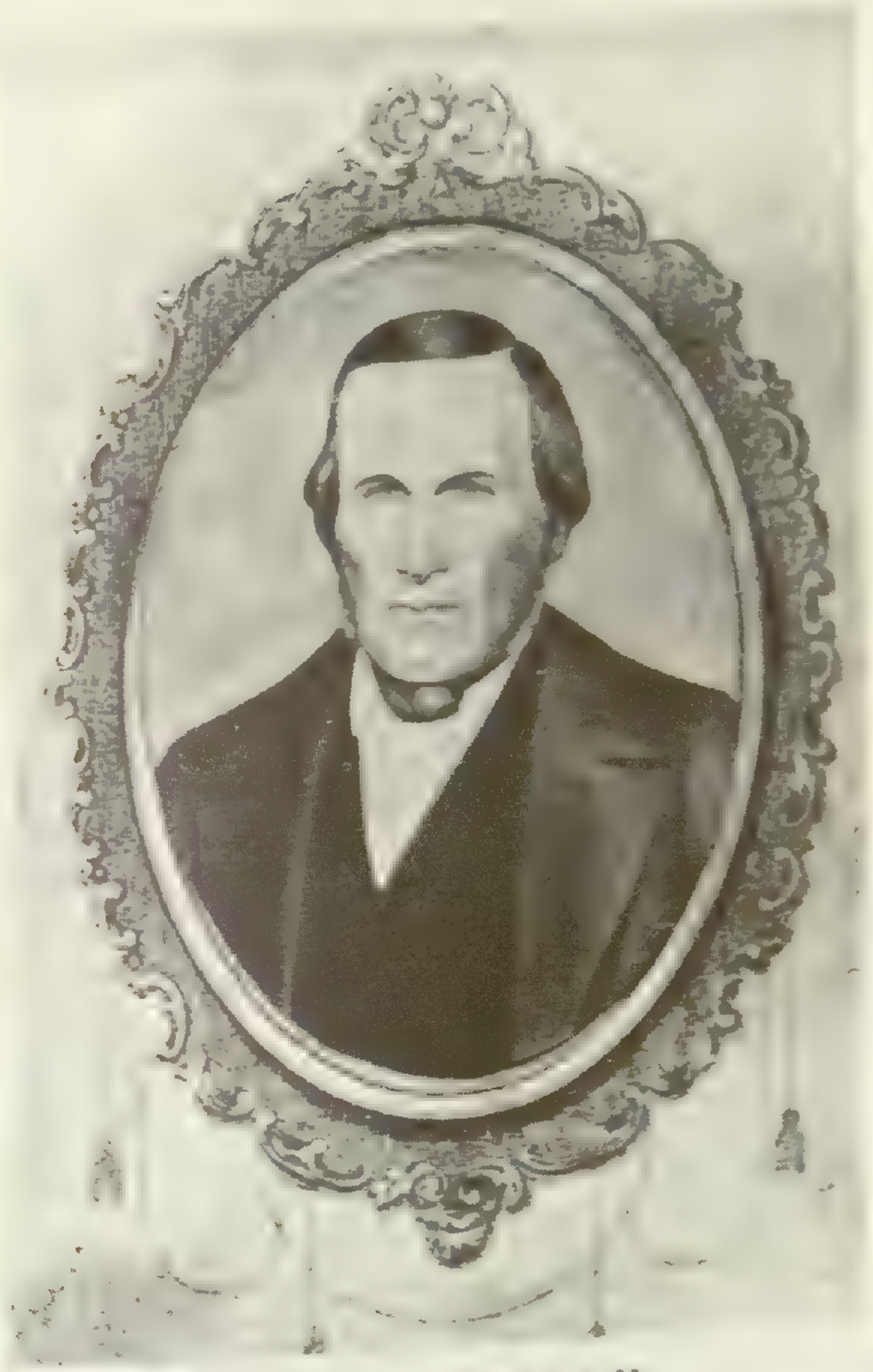
Henry Dalton, the first absentee owner after Reid, was an English merchant who settled in Southern California in 1845 after a successful business career in Lima, Peru. Funneling capital into land investments, Dalton at one point owned more than 45,000 acres of the rich San Gabriel Valley. From his home on the Azusa Rancho, Don Enrique managed his widespread holdings, including the 13,319-acre Rancho Santa Anita, primarily as agricultural units. Dalton's ability as an absentee administrator was never really



Henry Dalton

Thomas Dibblee

Harris Newmark



William Wolfskill

tested, though, as political pressures from the new American government (statehood was achieved in 1850) began to usurp the time, money, and energies of all holders of Spanish and Mexican land grants. According to the newly formed Land Commission, the burden of proof in land grant claims in California lay solely with the owner, and land which was not officially claimed or on which the grant was declared invalid, became public property. Henry Dalton's last years thus became a long and costly tangle of research and litigation. Early in this frustrating period (1854) he was forced to sell a neglected and deteriorating Rancho Santa Anita in order to raise money for further litigation. The Santa Anita grant was "easily" confirmed some four years later, but a demoralized and impoverished Dalton spent another twenty years securing title to his other properties, including the Azusa homesite. Dalton finally won the proverbial battle, but lost the war — title to Rancho Azusa was confirmed in 1876, but by 1881 he had lost the homesite in a mortgage foreclosure.

Dalton's successor at the Santa Anita Rancho, relieved of the financial burden of proving title, exercised a liberal hand in the maintanance and improvement of the neglected property. Joseph A. Rowe, owner and star equestrian of Rowe's Olympic Circus (the first such entertainment in California), paid $33,000 cash for the land on which he planned to make his permanent home. An additional $6,000 went into rebuilding the crumbling Hugo Reid Adobe; the old tule and brea roof was replaced with tiles and shingles and a new five-room wing was added facing the lake. This auspicious beginning was quickly lost in the quagmire of Rowe's financial mismanagement and ranching inexperience, however, and a national recession that drove money into hiding finished the ranching career of the only owner to actually lose money on his investment in Santa Anita. In 1857, Rowe borrowed $12,500 at 24% interest to cover his debts, and when that proved insufficient he managed to find a bidder for the ranch itself, an investment partnership that paid a mere $16,645 for title to Rancho Santa Anita. Joseph Rowe quietly left for Australia after clearing $2,300 on his $33,000 land investment.

The unlikely combination of Albert Dibblee, San Francisco vigilante coordinator, and William Corbitt and Mr. Barker, Los Angeles promoters, had purchased Rancho Santa Anita sight unseen from the floundering Rowe. Albert Dibblee entrusted management of the ranch to his younger brother, Thomas, while he remained in San Francisco earning money for capital expenditures and planning intelligently and creatively for the future development of the ranch. "I have never seen the property," he wrote, "but . . . all agree in describing it as one of the best ranchos in the Southern country . . . Santa Anita is admirably suited for grape growing. Every fruit of the temperate zone flourishes there and most of those of the tropics — oranges, almonds, etc., etc.

"My idea of the property," he continued, "is that it should be turned to account for stock raising . . . The increase of cattle here would be about 80% an. — that is 80 calves to 100 cows . . . This is to be by far the greatest stock-raising state in the Union . . . Cattle are usually worth $15 to $18 each in Los Angeles Co. Also sheep can be profitably raised by present appearances, as to pay, for wool growing."

The plans of Albert Dibblee were sound, but his timing unfortunate. The year 1862 began with three weeks of continuous rainfall, but was followed by almost three years of devastating drought that put an end to cattle ranching in

Southern California. Starved for green grass and water, cattle (and sheep, too) died by the thousands, their emaciated carcasses left to rot in the sun. As the spring-fed lake at Santa Anita dried and shriveled into little more than a marsh, so too did the plans of Albert Dibblee shrivel into oblivion.

In 1865 the partnership made the first of what would become many divisions in Rancho Santa Anita, selling the land in two sections. The smaller, 2,000 unimproved acres in the west, was sold to a German merchant and entrepreneur, Leonard Rose, at $200 an acre, while the heart of the rancho, 11,319 acres surrounding the homesite, went to ex-trapper, William Wolfskill for $20,000. In time, with patience and extensive irrigation, Rose created his highly-touted Sunnyslope estate with experimental grapes, quality citrus fruits, and prize-winning trotting horses his particular specialties.

A new day seemed to be at hand for the ailing Rancho Santa Anita. As agriculture steadily superseded cattle ranching in the California economy, names such as William Wolfskill took on increasing significance. A pioneering Kentuckian, Wolfskill had arrived in Mexican California in 1831 and quickly established himself as a land investor and budding horticulturist. A pioneer in the early wine industry, he won an award in 1856 for having the best vineyard in the state; a founder of the commercial orange industry in California, he owned in 1862 some two-thirds of all the orange trees planted in the state; an intrepid cultivator, he planted numerous kinds of fruit and nut trees including peach, pear, apple, almond, chestnut, and persimmon on his far-flung properties. William Wolfskill brought knowledge, experience, and a longtime enchantment with Rancho Santa Anita when in 1865 he moved into the old adobe near the lake. In 1866 he was dead. He had had time only to plant from seed (another first) a number of the then recently introduced Australian eucalyptus trees. A fine old blue gum, the "Wolfskill" eucalyptus, still stands near the homesite, a poignant reminder of many men's dashed dreams.

As Wolfskill's son, Luis, assumed ownership of Rancho Santa Anita, the transition from Mexican to American ways, from cattle ranching to agriculture, from single crop to diversified farming, seemed assured. With increasing stability, land prices rose to lucrative levels, and Luis further subdivided the ranch to gain maximum profits. Alfred Chapman purchased 1,740 acres (the section now known as "Chapman's Woods") for $19,500, skyrocketing Santa Anita's market value to over $11 an acre. The balance of the ranch (now reduced to 8,000 acres), including the homesite, was offered for sale in 1870 at $9 an acre, in 1871 for $10 an acre, and again in 1872 at $10.50 an acre.

Luis Wolfskill found his buyer in 1872 in Los Angeles merchant, Harris Newmark. A shrewd man, Newmark realized that it was only a matter of time before the railroads would complete their lines into Los Angeles, thus opening the area to national markets and inevitably boosting the value of land. Beating the Southern Pacific to the scene, however, was Elias Jackson ("Lucky") Baldwin, homespun Yankee capitalist, who in 1875 paid a fantastic $200,000 ($25 an acre) for Rancho Santa Anita. With a businessman's determintion and a farm boy's enthusiasm, he set about to make his investment pay, and in doing so fulfilled the bright promise so many before him had also seen in the "fairy spot of the Valley."

Sandy Snider is an assistant in the historical section at the Arboretum.

A Landfill Botanic Garden

Armand Sarinana

THE PROBLEMS of establishing a botanic garden over a landfill are due primarily to the limiting characteristics of any completed sanitary landfill—subsidence and abnormally high soil temperatures. Horticultural challenges result from these characteristics and their resulting offshoots such as sprinkler-line breakage, interrupted drainage, and soil unsuitable for root growth. One additional and very crucial factor of this challenge at the South Coast Botanic Garden is the nature of the native soil.

From the twenties until the mid-fifties, the area was considered one of the richest sources of diatomite in California and was mined, therefore, for this reason. The native soil, then, is diatomaceous earth, composed primarily of the silicified skeletons of unicellular aquatic algae called

Once the dahlia garden, this area near the entrance remains one of most photogenic at South Coast Botanic Garden.

diatoms. Though this soil is very valuable as an industrial filter, carrier, and insulator, it is devoid of any organic matter so essential for plant growth.

In 1959, when the idea of transforming the landfill into a botanic garden was finally accepted, the amending of this native soil began. It was the first step necessary for the development of a garden. Manure was donated by the local horse-owning residents, chips were brought in from the Southern California Edison Company's tree-trimming operations, and nitrohumus was donated by the Kellogg Company. These materials were all used to form a much needed compost. As portions of the landfill were completed in accord with the contoured terrain specified by the Department of Arboreta and Botanic Gardens, the final three feet of native soil was added and stabilized. This covering was then amended with the previously prepared compost. The incorporation of this compost corrected the organic and nutritional deficiencies of diatomaceous earth. Fertilizers were later added to provide the final ingredient in creating a suitable medium for plant growth. Two other necessary factors in good landscaping affected by the nature of diatomaceous earth at this garden are soil drainage and irrigation. The native cover soil of this garden has a tendency due to its fine texture to resist water penetration, and once the one-inch surface is wet, further penetration requires prolonged exposure to water. Therefore, the addition of organic matter is necessary to change the structure of the soil and permit vertical water penetration and drainage. The principle of repeated, long-interval irrigations is followed to provide deep moisture for good root development. The necessity for continual deep irrigation thus becomes the most crucial factor in maintaining plant life here at South Coast.

The development of any garden must have direction and objectives, usually provided by a master plan flexible enough to meet any changes in priorities, budget, or philosophy. The Department's aim is to establish three botanic gardens each different from the other but developed to emphasize the flora most adaptable to its localized climate and soil conditions.

The original planting concept of this garden required that the design allow for a continuity of plantings of special genera in groups consistent with the overall design. For example, erythrinas could be featured in a particular area for interest, comparison, and study, and with as many different varieties as feasible, but should be distributed in such a manner within a small area that the structure of the trees and blooming habits would conform to the landscape design. Other plants or trees could be blended into this grouping to give continuity of planting.

The circling tram road and auxiliary paths throughout the garden with plantings of ground covers, shrubs, and trees, as well as color of annuals and perennials, would be designed to allow for groupings of trees and complementary open areas and vistas.

This concept has been followed and expanded to the extent that the compatibility of plants, trees, and ground covers will be emphasized. This compatibility or harmony of plants will be houseowner-oriented in order to serve as a guide for landscaping and as a horticultural exhibit of beauty and interest.

The official birth of the South Coast Botanic Garden occurred on March 1, 1960 when the Board of Supervisors adopted an order approving a recommendation to designate County Landfill #1 as a botanic garden. The official dedication took place on April 20, 1960, at the future Crenshaw Boulevard entrance when a group of officials representing the Departments of Arboreta, Sanitation, Engi-

neering, and the Board of Supervisors, met with representatives of the interested citizen groups who had initiated the botanic garden idea. Three ginkgo trees were planted during the dedication. An initial three and one-half acres of completed slope were turned over to the Department of Arboreta.

On Saturday morning, April 6, 1961, the first mass planting ceremony took place. Again, representatives of the Departments of Arboreta, Sanitation, Board of Supervisors, County Forestry, and State Forestry met with representatives of citizen groups such as the California Federated Garden Clubs, and the California Association of Nurserymen. The Manhattan Beach Youth Band provided the music while the colors were presented by the South Bay Girl Scout Mariners. This planting of the three-and-one-half-acre filled-in slope facing Rolling Hills Road was planted to provide color, quick cover, and erosion control. Over 25,000 plants were purchased and furnished by the Arboretum, mostly ground covers and some shrubs. A few hundred plants were donated by the local nurseries, and over 5,000 were donated by garden clubs, private citizens, and children. The total of individual plants was 40,000.

In this initial planting project, 153 flats of ground covers were used, consisting of white trailing iceplants (*Delosperma* 'Alba,' and *Malephora purpureacrocea*), periwinkle (*Vinca major*), trailing gazanias (*Gazania lencophylum* uniflora), Hall's honeysuckle (*Lonicera japonica* 'Halliana'), lantana (*Lantana montevidensis*), *Asparagus sprengeri,* verbena, knotwood (*Polygonum capitatum*), and many other perennial ground covers. Shrubbery and trees were also added including eucalyptus (*E. citriodora, E. erythronema,* and *E. erythrocorys*), acacias (*A. verticillata, A. retinodes*), xylosma, callistemons, strelitzias, nandinas, cassias, Mexican cypress (*Taxodium mucronatum*), and the dawn redwood (*Metasequoia glyptostroboides*).

In November, the second four-acre filled-in area was seeded with hundreds of pounds of donated wildflower seeds and additional donated and purchased shrubbery and trees. Other plantings included over 4,000 cactus and succulent varieties; palms such as erytheas, livistonas, and sabals; corals such as *Erythrina caffra;* orchid trees (*Bauhinia blakeana*); and over 200 roses donated by the Girl Scout troops in the area.

The two most distinguishing parts of this landscaping were the giant Girl Scout emblem outlined in purple vetch with a center of California poppies, and the planting of the still-existing elephant or Umbu tree (*Phytolacca dioica*), donated by the local 4H Club for the March 7 Arbor Day celebration.

The Dahlia Society trial plots were also started and South Coast became the ninth trial garden in the nation where each year new varieties were sent to be grown, tested, and rated.

The distinguishing dawn redwood and *Acacia retinodes* at the entrance gate on Rolling Hills Road still greet the public. The three Mexican cypress (*Taxodium mucronatum*) have flourished along the main chipped path leading from the parking area to the information window. The cactus and succulent grouping and the many palms in their midst are one of the finest exhibits in the whole garden.

Today, approximately 80 percent of these original plantings are still flourishing. Their size and condition after 13 of 14 years of growth are not equal to what they would be under normal growing conditions, but that is understandable.

This is another in a series of articles by Armand Sarinana, superintendent of South Coast Botanic Garden, tracing the origin and development of that garden.

Photo by Don Graf

An Arboretum is for people . . .

to learn about plants and their relationship to air pollution, fuel shortages and other problems of our times. But arboreta and botanic gardens are also for pure enjoyment, such as found while walking through the camellia forest at Descanso Gardens during the peak blooming season. And that season is at hand, both at Descanso and at the Arboretum where camellia shows will soon be held and where visitors can see literally thousands of magnificent blooms.

SCE

Southern California Edison Company

BOOKSHELF

GARDEN PESTS & DISEASES OF FLOWERS & SHRUBS by Magens Dahl & Thyge B. Thygesen. Macmillan, New York, 1974

This is a good pictorial book dealing with garden pests and diseases for green thumb enthusiasts. It provides visual identification of some common insects, diseases, and nutritional problems in one's garden, including gnawing animals. Drawings on insects and their damage patterns are lifelike and are very helpful in recognizing these pests. However, pictorial presentations on diseases and nutritional problems are atypical, and it is doubtful that home gardeners can diagnose diseases based on these drawings. Disease symptoms vary with stages of development so that full description is needed for accurate diagnosis.

This is not a professional book in the science of entomology or plant pathology. Descriptive information is too brief and too incomplete. It is, however, a book of general information for beginners who are interested in knowing something about garden pests and diseases.

—*Paul Cheo*

Recent acquisitions to LASCA Plant Science Library:

THE AFTER-DINNER GARDENING BOOK, R. W. Langer. Macmillan, New York. 1974. 198 p. Black and white illustrations.

BIOETHICS: BRIDGE TO THE FUTURE, V. R. Potter. Prentice-Hall, Englewood Cliffs, N.J. 1971. 205 p.

DECIDUOUS GARDEN TREES AND SHRUBS, A. Huxley. Macmillan, New York, 1973. 216 p. Color illustrations.

DIRECTORY OF AMERICAN HORTICULTURE, AMERICAN HORTICULTURAL SOCIETY. Rev. ed. Mount Vernon, VA. 1974. 119 p.

DWARF SHRUBS, D. Wyman. Macmillan, New York. 1974. 137 p. Black and white and color illustrations.

EVERGREEN GARDEN TREES AND SHRUBS, A. Huxley, ed. Macmillan, New York. 1973. 181 p. Color illustrations.

IDEAS FOR HANGING GARDENS. Sunset. Lane, Meno Park. 1975. 80 p. Black and white and color illustraitons.

IDENTIFICATION OF PLANT VIRUSES, D. Noordam. Pudoc, Wageningen. 1973. 207 p. Black and white and color illustrations.

INORGANIC PLANT NUTRITION, H. G. Gauch. Dowden, Hutchinson & Ross. Stroudsburg, Pa. 1972. 488 p.

INVENTORY OF RARE AND ENDANGERED VASCULAR PLANTS OF CALIFORNIA, W. Robert Powell, ed. California Native Plant Society, Berkeley, 1974. 56 p.

NATURE'S GUIDE TO SUCCESSFUL GARDENING AND LANDSCAPING, W. Flemer. Thomas Y. Crowell Company, New York. 1972. 331 p. Black and white illustrations

THE PLANT ROOT AND ITS ENVIRONMENT, E. W. Carson, ed. University Press of Virginia, Charlottesville. 1974. 691 p. Illustrations.

PLANT TISSUE AND CELL CULTURE, H. E. Street, ed. University of California Press, Berkeley. 1973. 503 p. Black and white illustrations.

THE TERRACE GARDENER'S HANDBOOK, Linda Yang. Doubleday, Garden City, N. Y. 1975. 281 p. Black and white and color illustrations.

VEGETABLE GARDENING, Sunset. 4th ed. Lane, Menlo Park. 1975. 96 p. Illustrations.

WEST AFRICAN TREES, D. Gledhill. Longman, London. 1972. 72 p. Black and white and color illustrations.

WILD FLOWERS OF THE CANARY ISLANDS, by David and Zoe I. Bramwell. Thornes, London. 1974. 261 p. Black and white and color illustrations.

WILD GREEN THINGS IN THE CITY; A BOOK OF WEEDS, Anne Ophelia Dowden. Crowell, New York. 1972. 56 p. Color illustrations.

A FIELD GUIDE TO THE COMMON AND INTERESTING PLANTS OF BAJA CALIFORNIA, Jeanette Coyle and Norman C. Roberts. Natural History Publ. Co., La Jolla. 1975. 206 p. Color illustrations.

A FIELD GUIDE TO WESTERN MUSHROOOMS, Alexander H. Smith. Univ. of Michigan Press,, Ann Arbor. 1975. 280 p. Color illustrations.

THE NATIVE ORCHIDS OF THE UNITED STATES AND CANADA, excluding Florida. Carlyle A. Luer. New York Botanical Garden, New York. 1975. 361 p. Black and white and color illustrations.

Lasca Leaves

ACACIA CONFERTA (Cover)

The Arboretum first received *Acacia conferta* as seed shipped from Cambara, Australia, in 1970. It is an extremely attracive evergreen shrub with a great deal of potential for small garden areas due to its compactness and diminutive size. Although it grows to eight feet in height in Australia, it reaches only four feet in Southern California. It is a semi-dense shrub with narrow leaves (phyllodia), linear to oblanceolate, suppressed, crowded, mostly glabrous, without nerves, with or without stipules.

Acacia conferta flowers from January through April. The small flowers are numerous and showy with flower heads made up of bright yellow flowers that are globular and about ¼-inch in diameter.

This Arboretum introduction is indigenous to Queensland, Australia. It prefers full sun, well-drained soil, and has moderate food and water requirements. No insect pests or diseases have been observed in Arboretum plantings.

With the space that is being allotted for ornamental plants in the home garden shrinking with each passing year, small easy-to-grow plants such as *Acacia conferta* undoubtedly have a bright future.

ARBORETUM WEATHER

Lat. 34°08'48" N.
Long. 118°02'59" W.
Elev. 571.28 ft.

Weather season:
Oct. 1 to Sept. 30

	Aug.	Sept.	Oct.
Average daily maximum temperature	90.8	90.6	79.3
Average daily minimum temperature	57.8	60.3	52.0
Highest temperature	100	105	99
Lowest temperature	52	53	45
Number of clear days	15	21	14
Number of partly cloudy days	11	7	12
Number of cloudy days	0	2	3
Rain during this month	0	.06	.58
Total rain since Oct. 1st	0	0	.58

Calendar

December. January. February. March

ARBORETUM. Arcadia

Dec. 13, 14 — 9 to 5 p.m.
Camellia Show*
Presented by S. Calif. Camellia Council.
Jan. 11 — 10 a.m.
Sunday Morning Walk*
"Historical Buildings"
Sandy Snider, curatorial aid
Jan. 16 — 8 p.m.
Theodore Payne Foundation Lecture**
"Ultraviolet Flower Patterns"
Dr. C. Eugene Jones, Asst. Prof. of Botany, Calif. State U.
Jan. 17, 18 — Sat., **1 to 4 p.m.**
Sun., 10 to 5 p.m.
Iris Show*
Presented by S. Calif. Iris Society
Jan. 24, 25 — 10 to 5 p.m.
Bonsai Show*
Presented by Baikoen Bonsai Society
Jan. 31, Feb. 1 — Sat., 1 to 5 p.m.
Sun., 8 to 5 p.m.
Ivy Show*
Presented by American Ivy Society
Feb. 14, 15 — Sat., 1 to 5 p.m.
Sun., 9 to 5 p.m.
Camellia Show*
Presented by Temple City Camellia Soc.
Feb. 29 — 2 p.m.
Sunday Afternoon Talk*
"Vegetable Gardening"
Ronald Call, education assistant
Mar. 7 — 2 p.m.
Sunday Afternoon Talk*
"Container Gardening"
John Provine, superintendent
Mar. 14 — 10 a.m.
Sunday Morning Walk*
"Asiatic and North American Section"
Dr. Gary Wallace, Arboretum biologist
Mar. 19 — 10 a.m.
Theodore Payne Foundation Lecture**
"California's Common and Uncommon Wild Flora"
Mr. and Mrs. Ray Raymond, naturalist-photographers
Mar. 27, 28 — 9 to 5 p.m.
Aril Show*
Presented by Aril Society International
*Sponsored by the California Arboretum Foundation, Inc.

DESCANSO GARDENS. La Canada

Dec. 6-14 — 9:30 to 4:30 p.m.
Christmas Decorations Exhibit
Presented by Descanso Gardens Guild
Jan. 10 — 1 p.m.
Annual Rose Pruning Demonstration*
Presented by Pacific Rose Society
Feb. 8 — 2 p.m.
Sunday Afternoon Talk*
"Grafting"
George Lewis, superintendent
Feb. 27 — 8 p.m.
Theodore Payne Foundation Lecture**
"Life in the Mountains"
Betty Southam, botanist
Feb. 28, 29 — Sat., 12 to 5 p.m.
Sun., 9 to 5 p.m.
Camellia Festival*
Presented by S. Calif. Camellia [illegible]
Mar. 7 — 10 a.m.
Sunday Morning Walk*
"Camellias, Flowering Trees and Shrubs"
George Lewis, superintendent
Mar. 20, 21 — Sat., 12 to 5 p.m.
Sun., 9 to 5 p.m.
Daffodil Show*
Presented by S. Calif. Daffodil Soc.
*Sponsored by Descanso Gardens Guild

SOUTH COAST BOTANIC GARDEN

Palos Verdes Peninsula
Dec. 21-27 — [illegible] to 5 p.m.
"Once Upon a Christmas Eve"
Jan. 9 — 9 [illegible]
Theodore [illegible] Foundation Lecture**
"Indian [illegible] Early Uses of California Native Plants"
Dorothy [illegible] environmental consultant
Jan. 11 — [illegible]
Sunday [illegible] Talk*
"Pruning [illegible] Deciduous Trees"
Armand [illegible] and Edward Hart, superintendent and asst. superintendent
Jan. 25 — [illegible]
Rose Pr[illegible] Demonstration
Feb. 21 — [illegible]
"Hanging Baskets"
[illegible] adult education
[illegible]
[illegible] Walk*
[illegible] Ground Covers"
[illegible] superintendent
[illegible] Supt., Descanso Gardens; South Coast Botanic Garden
[illegible] operation with the Descanso and Botanic Gardens
[illegible] each month at 8 p.m.
DESCA[illegible] Sunday of each month
2nd [illegible] Sun Fernando Adult
[illegible]
Spon[illegible]
Socie[illegible]
SOUTH [illegible]
3rd W[illegible] of each month at
Spon[illegible] South Coast Botanic
Garde[illegible] ation

March
1976
vol. XXVI
no. 1

Pasca leaves

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Lasca Leaves

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Editor
Donald S. Dimond

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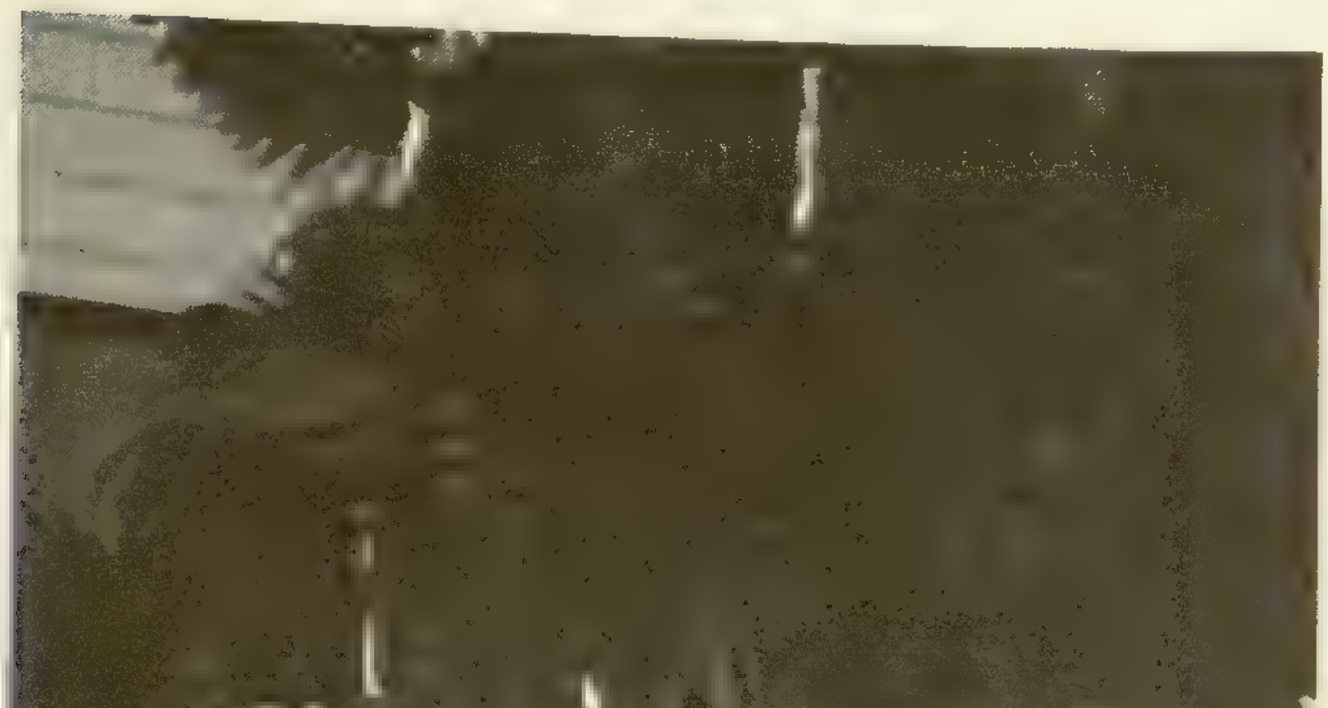
Department Notes

LAS VOLUNTARIAS

THE ARBORETUM'S official volunteer organization, Las Voluntarias, has a new set of officers as a result of a membership-wide election held during the annual business meeting last January 12th. Marilyn Llewellyn of Arcadia succeeded Mitzi Moore as president; Phyllis Chapman of Sierra Madre succeeded Nancy Cole as first vice president; and Carol Overturf of San Marino succeeded Mary Atkinson as second vice president. Marjorie Roos of Arcadia was elected to a second term — terms are for one year — as secretary.

Outgoing president Mitzi Moore is among those who have served two terms During her tenure the annual Baldwin Bonanza expanded as a special event with greatly increased attendance, and the volunteer office was more efficiently organized. Mitzi also led history tours under the school field trip program and expects to do so again now that she has a bit more time. Her successor, Marilyn Llewellyn, has also served as a field trip leader and has worked for the past five years as an instructor in the youth education program. But it can be truly said that all Las Voluntarias is composed of women dedicated to serving the objectives of the Arboretum, and their effort and example is a basic reason why membership has grown to a new high of 250 as compared with just 86 members six years ago.



Mrs. Thomas Moore and Mrs. John Llewellyn, outgoing and newly-elected presidents of Las Voluntarias.

BALDWIN BONANZA VI

FROM PAT COPLEY, publicity chairman for Las Voluntarias, comes this report: "The Baldwin Bonanza, the Arboretum's great plant sale which each year expands to offer new gardening opportunities, will be held Sunday, April 4, from 9 to 4:30 p.m. Mrs. William Opel, chairman, reports that the 200 members of Las Voluntarias, the volunteer arm of the California Arboretum Foundation, have been planning, planting, making crafts and collecting for many months in preparation for the event Proceeds are earmarked for the new Hall of Environmental Education, a building to house youth and adult classes, exhibits, flower shows and lectures.

"Arboretum Foundation members should mark their calendars for the previous evening, Saturday, April 3 for the

Some of the different types of cycads to be sold at the Baldwin Bonanza, April 4.

exciting Preview Party, which will be from 5 to 8 p.m. Invitations will soon be in the mail.

"Cycad seedlings, grown from seed by Mr. Loran Whitelock from his world-wide collection, will be the special feature this year. The cycads, with a lineage in excess of 280 million years, are spectacular accent plants. The new Prehistoric and Jungle Garden features specimens donated by Mr. Whitelock.

"In addition, Arboretum plant introductions will be available, such as the popular Blue Hibiscus *(Hibiscus huegelii)*, Crown of Gold *(Cassia excelsa)*, Gold Medallion Tree *(Cassia leptophylla)*, Snake Bush *(Calothamnus validus)*, Australian Black Boy *(Xanthorrhoea quadrangulata)*, Green Bottlebrush *(Callistemon pachyphyllas* var. viridis), *Combretum fruticosum, Stigmaphyllon affine, Beaufortia sparsa, Kunzea pulchella, Melaleuca elliptica,* and *Grevillea nematophylla*. Other plants to be offered, both for home and garden, include ferns, sinningias, begonias, herbs, palms, pelargoniums, orchids, cactus and succulents and beautiful terrariums.

"Hanging baskets are much desired for home display, and the volunteers will offer a variety of these as well as varied living sculptures made by attaching ferns and bromeliads to lava rock, driftwood, palms, and manzanita. Another special booth that has been tremendously popular in past years is the 'Collectables Corner.' Home furnishings dating from the 1920's or earlier are 'hot' decorator items these days, and for this Bonanza a rich source has been tapped.

"On Sunday there will be a clown to entertain the children; the clown will also pass out flower and vegetable seed packets. As always, coffee, cola and cookies will be available to provide a refreshing break. Thanks to many area merchants who have donated gift items, outstanding prizes will be raffled off both Saturday evening and Sunday. Tickets may be purchased from Las Voluntarias members

or by calling the Foundation office, (213) 447-8207.

"It is hoped the sun will shine brightly (last year it rained) on this exciting sale which benefits all who enjoy the Arboretum!"

FIESTA DE FLORES

THIS YEAR'S Fiesta de Flores at South Botanic Garden will be held on the weekend of May 15th and 16th and will mark the fourteenth annual presentation of the popular event by the South Coast Botanic Garden Foundation.

Hard-working planners expect the forthcoming Fiesta to be in the "best ever" category since they will have at their disposal for the first time the facilities of the recently completed Administrative Center. The 7,000-square-foot auditorium will be used for the exhibits of participating garden clubs, plant societies, commercial firms and individuals; the classrooms will become lecture halls; and a small, but well-equipped kitchen will facilitate the serving of the traditional light lunch - soft drink menu which will be presided over this year by Foundation vice president and member of the three-man Fiesta coordinating committee, Eugene Hillman.

Foundation trustee Florence Siudmak, another dedicated volunteer and second member of the committee, will organize the "Discovery Walk," successfully initiated last year by the volunteer tour guides of Amigos del Jardin. The guides and members of the Audubon Society will man stations in various sections of the Garden, answering the questions and giving information on the Garden's history to visitors who stop by.

Helen Pickett, the third member of the coordinating committee and Foundation second vice president, has announced that Fiesta '76, which has as its theme, "A Dream Come True," will open with a 7 p.m.-to-midnight ball on Friday the 14th. Named the "Baile de la Fiesta" by trustee Helen Gates, it will include a buffet supper, dance, and entertainment. Helen says that invitations will soon be in the mail and the Foundation sincerely hopes that many members of the Arboretum Foundation and the Descanso Gardens Guild will join them on this happy occasion.

A key activity during the Fiesta is the sale of plants, an operation to be supervised by Alice Quiros, a longtime supporter of the Garden. An experienced and enthusiastic horticulturist, Alice will also display some of her prize plants in a shade patio next to the main building. As everyone working on the Fiesta knows every dollar, quarter, dime and penny raised will assist the Foundation in meeting its pledge of $200,000 toward the Administrative Center.

And finally, South Bay and Peninsula artists — musicians and painters — will add their own special grace during the two days of the Fiesta by performing for all to watch, hear, and enjoy.

ANNUAL MEETING

MRS. JOHN A. "TOOTIE" GRIVICH, president of the California Arboretum Foundation, reports that the C.A.F.'s annual business meeting will be held May 5th, starting at noon, under the saran shade-area alongside the Garden For All Seasons. Following a box lunch cheon the meeting will proceed with business reports and the nomination and election of new members ot the Board of Trustees. Then will come a tour of the new Tropical Greenhouse followed by the traditional yearly plant distribution to all members. Special tram tours of the Arboretum will be available prior to the start of the meeting.

GUILD ACTIVITIES

CAROLYN CERVIN, Descanso Gardens Guild secretary, has sent the following report: "Among the many activities to be featured this year by Descanso Gardens Guild will be the continuation of the Gourmet Luncheon Series for members and their guests. This expanded use of the beautiful garden kitchen in the Hospitality House has been directly responsible for the increased Guild membership in many cases. After eating her way through stuffed grape leaves, moussaka, Greek ring bread, salad with feta cheese, baklava, and tea or coffee, a guest is more apt than not to inquire about the possibility of joining in order to enjoy more luncheons, to work in the garden kitchen, or to help arrange the flowers. Her interest thus stimulated, she inquires about other Guild and Garden activities.

"When the group began under the direction of Lee Adams, entrees included such delights as seafood crepes, baked chicken salad, and quiche. Now under the combined direction of Dottie Aronstam and Billie Loofbourow, the emphasis has been on foods with a foreign flair. Recent countries featured have been Mexico, Italy, France, Greece, and Germany. England and India-Indonesia will be featured this spring. Although these luncheons result in a small profit margin, the sale of the recipe cards from 1974 and 1975 has brought in several hundred dollars to further Guild activities.

"The gourmet group has also been responsible for the food served at other Descanso Gardens Guild affairs, such as the chrysanthemum reception, the Red Carpet Tea, the coffee shop at the Christmas show, the annual membership tea, and the refreshments served following the mini-classes."

DEDICATION CEREMONY

A DEDICATION ceremony will be held April 23rd in front of the new South Coast Botanic Garden Administrative Center starting at 10 a.m. Among the many officials and supporters of the garden expected to take part in the event are: County Supervisor James Hayes, members of the Department's Board of Governors, Arboreta and Botanic Gardens Director Francis Ching, chief architect Don Hendrickson, members of the South Coast Botanic Garden Foundation including its founder, Mrs. Frances Young, and officials of the Sanitation District which has played a large role in the development of the garden.

LUNCHEON FOR VOLUNTEERS

ON THURSDAY, April 29, volunteers from the Descanso Gardens Guild, the South Coast Botanic Garden Foundation, and the Southern California Camellia Council, will join Las Voluntarias of the California Arboretum Foundation for a special Volunteers Day at the Arboretum. Besides a luncheon hosted by the director, Francis Ching, the special day is in appreciation and recognition of the valuable assistance rendered throughout the year by the supporting organizations. Collectively, approximately 50,000 hours are contributed by volunteers each year assisting in school field trips, library and research programs, nursery and greenhouse projects, and in fund-raising programs.

The luncheon will be held in the Demonstration Home Gardens following a special tour of the Arboretum and tours of the Tropical, Begonia, and Orchid Greenhouses.

Vegetables, Freeways and Lead

George P. Hanson

PUBLIC INTEREST and participation in vegetable gardening has risen in recent years to a level comparable to that which prevailed during World War II when maintaining a "victory garden" was a badge of patriotism. The activity today has exceeded the boundaries of the backyard plot and has spilled over into an assortment of vacant lots whose owners are willing to lease out parcels pending some more profitable use of their property.

Today's urban family farmer is lured, however, mainly by the promise of superior quality produce at lower cost. By superior quality is generally meant vegetables that taste better, are more nutritious, and are free of commercial pesticides and "chemical" fertilizers. A corollary benefit sometimes cited is the sense of physical and psychological well-being derived from the family sharing of outdoor work, although such benefits may well be transitory.

Commendable as this revised interest with its potential benefits is, this author, for one, is concerned that the selection of garden sites is haphazard and that as a consequence, serious threats to health can arise. The urban gardener is forced to grow his vegetables in polluted soil and air. For example, a recent comparison of rural and urban garden sites in Scotland showed that the urban soils contained over twice as much boron, five times as much copper, seventeen times as much lead, and eighteen times as much zinc as the rural soils.

Plants absorb their nutrients from the soil and air and do not selectively avoid toxic pollutants. If the plant absorbs a toxic pollutant it becomes unthrifty or damaged and may eventually die. The result disturbs the gardener but does not afford him any harm except for the small financial loss of a potential meal. The real danger lies in those absorbed pollutants which are not toxic to the plant but which are toxic to animals and humans that eat these contaminated greens. Areas along heavily travelled highways, for instance, are heavily polluted. A recent analysis of the grasses growing within 300 feet of a California highway carrying 38,000 cars per day showed the vegetation to be toxic to cattle and horses.

The death of a number of horses in the San Francisco Bay area serves as a reminder of the potentially tragic consequence of eating polluted vegetation. The

major source of nutrition for the affected animals had been pasture grass. Near the pasture was a lead smelter. Bridges and naval vessels in the area were being sand-blasted to remove old lead-based paint. Large numbers of motor vehicles in the area were exhausting lead and other pollutants. The diagnosis for the horse deaths was chronic lead poisoning. The lead pollutants had apparently been blown away from their sources by the prevailing wind and concentrated upon the pasture grasses by the filtering action of their leaves.

The failure of lead toxicity symptoms to appear among vegetable gardeners in the area can be attributed to two factors: 1) people do not obtain their sole nutrition from home-grown vegetables and 2) humans normally wash their food prior to eating it. Studies have shown that 30 to 50% of the lead deposited on plant leaf surfaces can be removed by thorough washing.

Lead is not an essential element for the human body and is, in fact, toxic in relatively low concentrations. Lead attacks the nervous system, the cardiovascular (heart and blood) system, and the kidneys. Red blood cells do not mature properly in the presence of lead. Lead also inhibits the function of an enzyme called delta-aminovalinic acid hydrase. This enzyme is believed necessary for normal brain development and proper heart function.

The amount of lead which a human can ingest before symptoms develop is dependent upon several variables, but the age of the individual is of major importance; children are most sensitive. Some authorities believe that the blood lead concentrations should not exceed 30 micrograms of lead per 100 grams of blood. Over one fourth of nearly 350,000 urban children surveyed in 21 cities in the United States were recently found to have blood levels of 40 micrograms or more per 100 grams of blood. These children were found to be in danger of damage to their central nervous systems.

We obtain our body burden of lead through the food we eat (1/3) and the air we breathe (2/3). Our digestive system absorbs only about 10% of the ingested lead but our lungs absorb 30% of inhaled lead. Children are especially prone to lead poisoning because of the quantities of dust and dirt they ingest and because of a disposition to eat lead-containing paint chips. Although all foods contain some lead, milk from cows fed contaminated hay, and vegetables grown in contaminated air and soil, are major contributors. Ceramic drinking vessels can also add lead to certain drinks.

Automotive exhausts are responsible for up to 98% of the lead artificially introduced into our ecosystem. Although lead as an antiknock ingredient in gasoline may eventually be phased out, most of the gasoline now sold contains lead. Comparisons made of lead concentrations in the air of cities and rural areas show that rural air is relatively free of lead. Approximately 50% of automotive lead is deposited within the first 100 feet from a roadway but a significant amount may travel up to 2½ miles. Much of the lead may remain suspended in the air for as long as a month; eventually it is washed out by rain or snow.

Plants absorb lead from the soil as well as from the air but air-borne lead is the major contaminant of plants grown near roadways. The hairiness or roughness of the plant parts determines the amount of lead accumulated and will likewise influence the ease with which lead can be washed from the plant. Vegetables grown near roadways may contain over 10 times the lead concentrations of plants grown in clean soil and air. The lead content of milk quadrupled in a recent Swiss experiment after dairy cattle were fed hay har-

vested along a major highway.

That portion of the plant consumed determines the danger of growing the vegetable in a lead polluted environment. Corn kernels are enclosed by husks, peas and bean seeds grow within pods, and the edible portions of watermelons, cantelopes and pumpkins are protected by a thick rind. The edible portion of crops such as tomatoes have a smooth, easily washed skin. Lettuce, cabbage, spinach, and broccoli are especially dangerous since the edible parts are directly exposed to lead dust and are impossible to wash clean. Root crops such as carrots, beets, and potatoes are safe from air-borne pollutants but are very susceptible to soil-borne contaminants. Soil exposed to lead pollution over a period of several years may retain sufficient lead to contaminate any plant grown therein. In any case, it is necessary to peel the crop (and thereby remove many nutrients as well) to remove the surface adhering lead.

Although most studies have been done on lead pollution, we also know that such toxic heavy metal pollutants as nickel, zinc, and cadmium are also deposited along roadways by motor vehicles. Motor oils contain small amounts of aluminum, barium, beryllium, boron, cadmium, chromium, copper, manganese, molybdenum, nickel, silver, strontium, tin, titanium, vanadium, and zinc. While most of these elements are natural contaminants of the fossil fuel, additives containing barium, boron, molybdenuum, and zinc improve lubricating qualities or serve a detergent function. Cadmium, a component of automotive tires, also becomes a pollutant as small particles of rubber are worn from the tire by the road surface.

Some of these heavy metals are toxic to humans in very small quantities. Nickel, cadmium, and chromium are carcinogenic in trace amounts. Cadmium, chromium, copper, manganese, vanadium, and zinc have a detrimental effect on cardiac or vascular function.

Those who choose to pasture or grow fodder for dairy cattle or otherwise wish to grow food for human consumption near highways should construct a living barrier between the roadway and the crop. This barrier of trees and shrubs should be evergreen or at least be in leaf during the time the crop is growing (deciduous trees and shrubs will allow the heavy metal pollutants to filter through and contaminate the soil during the off season).

Tree species display differing retentive capacities; those which are tall and dense with finely divided, hairy, and rough leaves are best for screening out the lead and other dust particles. A recent comparison in New Zealand of six tree species growing along a highway showed that the leaves of *Platanus orientalis* and *Acer pseudoplatanus* retained the most lead; those of *Ulmus procera* and *Quercus robur* were intermediate while *Aesculus hippocastanum* and *Fraxinus excelsior* bore leaves which were least retentive of lead particulates.

The number and kinds of trees and shrubs necessary to protect a garden area are unknown. At this time we can only note some generalities: 1) plant your garden as far away from pollution sources (highways, smelters, factories, etc.) as possible, 2) have several rows of well-established trees and shrubs between the garden and the source of pollution, 3) the greater the pollution danger, the greater one should restrict the kinds of vegetables grown to those in which the edible portion is well protected from air pollution fallout, 4) finally, wash all garden vegetables thoroughly before eating!

George Hanson is a senior biologist on the Arboretum's research staff whose special interests are plant breeding and air pollution in relationship to plants.

The Blue Gum

Leonid Enari

WHEN THE FIRST settlers arrived in Southern California they found a land of shadeless hills and sunburnt plains almost barren of trees and forests, except for willows along the stream beds, sycamores in the deepest canyons, and oaks on the moist side of a few coastal hills. In fact, when a flagpole was needed in 1850 to fly the first U.S. flag over

Los Angeles, it was necessary to send a crew of Indians to the pine forests of the San Bernardino Mountains to drag back two pine trunks.

Since that time, many varieties of woody plants have been introduced to Southern California from all parts of the world, some successfully, some not. Of all the trees brought in, the blue gum, an Australian eucalypt, has been the most successful. It was introduced into California in 1856 by William C. Walker, who planted seeds at his Golden Gate Nursery in San Francisco. Other nurseries and growers followed and began to propagate and sell seedlings of the blue gums and other eucalypts.

In a short time the blue gum was seen everywhere, and new arrivals took it for granted that it was a native California tree. Since anyone who has been in California five years is classified as a native, they were not too far off with their assumption.

In 1904, a rumor started that the supply of hardwood on the east coast would be completely exhausted within 16 years. The entire state of California became electrified.

Californians already knew that eucalypts could be grown in California and that they were used as hardwood in Australia. They also knew the Panama Canal would be open in 10 years with cheap transportation to world markets. Forever enthusiastic, they realized that by planting eucalypts now, they would be ready for Utopia. Eucalyptus-planting became a big business. To make ready for the boom, more than 50 nurseries began raising seedlings under lath, importing Japanese experts for the task. Railroad cars were equipped with racks to stack flats of seedlings. Stock companies were formed for planting eucalyptus hardwood forests. Land was sold at $250 an acre, already planted, with a guarantee that the trees would be cared for for ten years, at which time the lumber would bring a fortune. No mention was made, of course, that eucalypts after the first year grow without care. Lumber direct from Australia was used in homes and in Los Angeles banks to demonstrate its fine quality.

Widows, teachers, and small businessmen invested their life savings in the eucalyptus boom. Farmers ripped out staple crops to plant eucalyptus. The Santa Fe Railroad planted a giant grove at what is now Rancho Santa Fe and put in thousands of trees along their right-of-way. The Pullman Company planned to finish the interior of their cars with the beautiful grain of the eucalyptus and planted accordingly.

In the next eight years, some 40,000 acres of blue gum and 10,000 acres of other species of eucalyptus were planted in California.

Then, around 1908, the first doubts began to appear. The fast-growing timber warped, twisted and cracked during curing. A cynical railroad foreman in Nevada, on receiving a shipment of California eucalyptus railroad ties, reported it as a splendid product, except he could not find enough wood between the cracks to anchor a spike. Californians were still confident and attacked the problem. They dried the wood in the sun and in the shade. They tried cutting it while the soil was wet and while it was dry, when the sap was rising and when it was not. Nothing helped, the California eucalyptus appeared to be uncurable. What went wrong? Nothing, except the Californians were not told that the blue gum is not a timber tree in Australia, and that the fine Australian hardwood demonstrated in California had been cut from 100-year-old trees. That was the end. Not even the most enthusiastic California eucalyptomaniac was willing to start it all over

again and then wait 100 years for a get-rich-quick project to mature.

So the blue gum fell from favor as a commercial tree. But its success in windbreak and highway plantings became noticeable. There are supposed to be 2,000 miles of eucalyptus windbreaks alone in the southern part of California protecting citrus orchards.

The blue gum was discovered, described, and named by Jacques Houten de Labillardière, a naturalist in the expedition sent by the French Government to explore the Pacific in 1791. The trees of the new species he found in Tasmania were so tall he was obliged to cut down one of them in order to obtain its blossoms. Being already in a slanting position, it was easily felled. When Labillardière returned to France years later, France and England were again at war. As his boxes and specimens were sent to England, there was no way now to claim them. The British government, however, placed the interests of science above those of combat, and the naturalist's boxes and notes were delivered to France on a ship-of-war flying a white flag. Subsequently, Labillardière published his account of the voyage along with the description and picture that introduced the blue gum which he called *Eucalyptus globulus,* to the rest of the world.

To date, the blue gum has established itself, outside of Australia, in Algeria, Argentina, Brazil, China, Corsica, Cyprus, Equador, Eritrea, Ethiopia, Greece, Guatemala, India, Israel, Italy, Jordan, Kenya, Madagascar, Morocco, New Zealand, Paraguay, Peru, Portugal, Puerto Rico, Rhodesia, Spain, Sri Lanka, Tanganyika, Tripolitania, Tunisia, Union of South Africa, Union of the Soviet Socialist Republics, the United States, Uruguay, Zaire, and probably other areas.

The blue gum is a medium size to

Drawing by Patty Lawson

large tree reaching to 200 feet in its native habitat. The bark is bluish, greenish, greyish or brownish and shedding in long, thin strips. The leaves are lanceolate, usually sickle-shaped, petioled, alternate, leathery in texture, equally green on both sides and very aromatic when crushed. The leaves of the young seedlings and of sprouts from the mature trees, however, are quite different, being ovate, wider, sessile, opposite, softer in texture and conspicuously light bluish. The flowers are white or creamish-white, usually solitary, axillary in the leaf axils, and sessile or nearly sessile. The caps, (the operculums) which cover the flowers in bud and which are pushed off when they open, are flat. The fruits (seed-capsules) are warty, ribbed, blue-gray and with thick disks.

The tree reaches its greatest development along coasts and river beds where the annual rainfall is 15 or more inches and foggy days are common. Under these conditions it increases its height very rapidly and is one of the fastest growing trees in the world. Norman D. Ingham, in his Eucalyptus in California (published in 1908), reported on blue gum trees growing on the Forestry Station grounds at Santa Monica. At the age of four-and-a-half years, these trees averaged over 40 feet in height, and two of the specimens even 53½ feet.

At the Los Angeles State and County Arboretum, blue gums are found in quadrants D/7, D/8, K/9 and N/7.

The specimen in quadrant N/7, in front of the Queen Anne Cottage, is 160 feet tall, which makes it the tallest tree on the Arboretum grounds. It is known as the Wolfskill eucalyptus because it is believed to have been planted by William Wolfskill, one of the previous owners of the Rancho Santa Anita, a small part of which was to become the Los Angeles State and County Arboretum. It is highly unlikely, however, that this tree was in fact planted by Wolfskill. Harris Newmark, in his book Sixty Years in Southern California, published in 1916 in Los Angeles, mentions that when he bought the Rancho Santa Anita from Wolfskill's son Louis, in 1872, there were five blue gums growing near the house. It was his understanding that these were planted by William Wolfskill from seed sent to him by a friend in Australia, and that they were the first eucalyptus trees in Southern California. When Newmark told about the house he meant the Hugo Reid Adobe since this was the only house on the rancho at that time. The Queen Anne Cottage was built nine years later (in 1881) by E. J. Baldwin.

There is no reason to doubt that Wolfskill's blue gums were growing around the adobe when Newmark bought the rancho, but they certainly are not there anymore. Jack McCaskill, Assistant Plant Recorder of the Arboretum and Vice-President of the San Gabriel Historical Society, recalls that many old eucalyptus trees growing in the Arboretum were cut down in the late 1940s or early 1950s and hauled away truckload after truckload. Were the Wolfskill blue gums among them? There is no way to find this out.

If the blue gum in the front of the Queen Anne Cottage was not planted by William Wolfskill, then who did? Probably Baldwin, who is known to have planted many blue gums during the period he owned the rancho. The planting probably took place around 1880, in which case the tree is now 95 years old.

Dr. Enari, author of this series of articles on plants at the Arboretum, is a senior biologist in the Department's research division, taxonomist, chemist, teacher, and author of a number of textbooks on botany.

A Prehistoric Garden

Loran M. Whitelock

If we could step into a time machine and be transported back through the ages two hundred million years, what fantastic things could we expect to see? We would find a world quite different from that with which we are familiar. Most noticeable might be the giant dinosaurs roaming the countryside. Soaring overhead, pterodactyls, the flying reptiles and predecessors of our present day birds, look down on us. The climate is warm and dry over the entire earth and the land is covered with forests. These forests give us our only familiar link with the future. They are composed predominately of gymnospermous plants and large numbers of ginkgos, conifers and cycads. It is amazing that virtually nothing that we observe in this past age will survive in a more or less unchanged form for two hundred million years except these plants. Yes, they are still with us today, but not in those numbers that once covered the planet Earth. It is true that the conifers are common still, but the ginkgos and cycads are slowly disappearing and may some day join the dinosaurs and pterodactyls as an extinct life form.

A small section of this prehistoric forest exists today. The Arboretum's Prehistoric Garden lacks the huge reptiles that once wandered through the original forests, but many of the surviving plant forms are growing there. These "living fossils," our link with the past, are all the more fascinating when we become familiar with their history. The metasequoia, once known only from fossils in ancient rocks, and then discovered still unchanged in the unexplored mountains of China, grows here like a native. So do many ferns, horsetails, and the once-rare ginkgo. The cycads, not being as familiar to us, are possibly the most thought provoking, and stir our imagination to picture how prolific those forests were for so many millions of years but now extinct.

The conifers are known to most everyone who has traveled across the temperate countries of the world. Redwood, pine, and juniper are all common names to us that bring forth visions of these trees covering the mountains and highlands. Familiar also is the ginkgo or maidenhair tree of China that has become such a popular ornamental in gardens here. There are not many of us, however, who are familiar with the cycads other than the "Sojoclin."

Cycads generally have a trunk from one to ten feet or more tall. This trunk is covered with an armor of old leaf bases which give it protection from forest fires. Crowning the trunk is a tuft of pinnate leaves from three to twelve feet long.

The word "cycad" is the popular term for plants of the order Cycadales. The name Cycadeles comes from the Greek

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word "kykas," which means coco palm. The common names given to the cycads usually refer to palms, such as "sago palm," "bread palm," et cetera. The cycads have a very palmlike appearance with their tall trunks covered with dark green leaves. It seems strange then that the cycads are not even distantly related to the palms. Actually they are gymnosperms, which are midway between the ferns and conifers, and their outward appearance is inherited more from the form of tree ferns.

Reproduction

The reproductive structures of the cycads are so primitive that they are borne on modified leaves rather than in flowers. These "leaf scales" are compressed into erect cones, in general appearance resembling a pine cone. The plants are either male or female, the leaf scales in the male cones producing many pollen sacs on the underside, and the leaf scales in the female cones carrying two or more ovules. Pollination requires the female cone to be in the receptive stage, which can usually be determined when the cone scales open slightly. At this point there must be a male cone shedding pollen close enough so that wind pollination can take place. If the female cone is fertilized, the cone scales close tightly and the seeds begin to develop. This process takes from four to ten months or more depending upon the growing conditions. When the cone ripens, it fall apart dropping the large seeds around the base of the plant. The cones are normally green in color, but some African species have yellow or red cones. The mature seeds are covered with a brightly colored seed coat. This seed coat is usually yellow, orange, or red. The bright colors of the seeds and cones help attract birds and animals that feed on the fleshy outer seed coat and help in the dispersal of the seeds. In some species, neither the seed nor the cones are brightly colored. These are usually forms that grow on canyon sides where dispersal is accomplished when the cones disintegrate and the seeds tumble down the slopes, lodging finally in some crevice, or pocket of earth. Germination of the seed will, in most cases, take several months from the time it is shed from the cone.

Growth

Cycads are very slow-growing plants. For a mature, coning-size specimen to develop from seed it can take as long as four or five years in the small fast growing zamias, and fifteen to twenty years in the larger, trunk-forming species. These slow-growing plants can attain an actual age of many hundreds of years. Growth rate of the trunk may be as little as a quarter of an inch per year in mature plants of some species, while others have been known to grow as much as six inches in a single season.

The leaves of cycads are usually produced yearly. Growth is started in the spring, the leaves attaining full size in a period of about four to eight weeks. With a mature plant, leaves will sometimes alternate with the production of cones Rarely will cones and leaves be produced at the same time.

The size of cycad species is quite variable. The tallest species known is *Lepidozamia hopei* from Queensland, Australia It attains a trunk height of approximately seventy feet! The smallest species is *Zamia pygmaea* from Cuba, with an underground carrot-like tuber, and leaves less than a foot tall. Plants of *Dioon spinulosum* in the jungles of Mexico have been recorded with trunks over fifty feet high.

Distribution

Our present-day complement of cycads is restricted to the tropics and semi-tropics of the world. They are the remnants of the forest that covered the earth when the climate was uniformly warm. The

Encephalartos natalensis *in the Arboretum's Prehistoric and Jungle Garden is estimated to be 75 to 100 years old. Plant is native to South Africa.*

Cycas revoluta *in the Arboretum's Prehistoric and Jungle Garden is estimated to be 90 to 100 years old. Plant is native to southern Japan.*

number of living forms of cycads as compared to most plant groups is very small indeed. There are only ten genera and about one hundred and forty species in existence today. Four of these genera occur in the American tropics. They are Microcycas, Dioon, Zamia and Ceratozamia. There are also four genera to be found on the Australian continent and Southeastern Asia, namely, Macrozamia, Lepidozamia, Bowenia and Cycas. The remaining two genera, Encephalartos and

Stangeria, are native to the continent of Africa.

Although the world distribution of cycads covers many thousands of miles, the actual number of plants to be found in any locality is usually small. As a general rule, these scattered colonies are not faring well. The pressures of civilization, primarily in the form of clearing land for agriculture and urbanization, have taken their toll. At least one species is now extinct in the wild state, and many others can be considered endangered.

Endangered Species

When the numbers of any species are reduced, they will eventually reach a critical point at which reproduction is not rapid enough to replace the individuals lost to fire, disease, old age, or other environmental factors. When this point is reached, their only salvation is through man's interest in conserving them. Man can accomplish this by induced reproduction and cultivation under controlled conditions in such places as botanic gardens. There are, however, exceptions to the decline of cycad forms. Some species of Zamia and Ceratozamia in the Americas, and Macrozamias and Cycas in Australia in the South Pacific produce enough viable seed to either hold their numbers constant, or, in some cases, to increase. This is, sadly enough, the exception and not the rule.

Large collections of cycads, both public and private, are uncommon. There are several factors that contribute to this scarcity. First of all is the space required. Most species of cycads have long leaves, some reaching fifteen feet in length. It does not take much imagination to visualize the amount of space necessary for several plants, each with a leaf spread of thirty feet! Another problem is climate. As most species of cycads require at the very least a temperate climate, the areas where they may be grown outside is restricted. The cost of building and heating conservatories large enough for maintaining a collection of cycads in cooler areas is prohibitive. The primary problem, of course, is obtaining the plants. Many of the countries where cycads occur have laws restricting their collection and export. If this can be overcome by obtaining the proper permits, the next step is to locate the desired plants. This can sometimes take days, weeks or months of searching very remote and inhospitable country. Once they are located, there comes the task of removing them unharmed from the rocks and cliffs and transporting them many hundreds or thousands of miles to their destination. When the plants are at last received, the problem of reestablishing them must be overcome. This can take months or years. As a general rule, it will take a cycad three to five years to reestablish to its original growing condition.

Collection

The Arboretum's Prehistoric Garden contains a sizable collection of cycad genera and species. Of the ten known genera, nine are represented here. Only Microcycas, a rare monotypic genus from Cuba, is missing. A total of approximately 54 species is on display. More species will be added as collections are made and a sizeable area for expansion has been provided.

Yes, this Prehistoric Garden is to be found at our Arboretum. It is there for your enjoyment as you ponder the past history of the world!

Loran Whitelock, a member of the California Arboretum Foundation Board of Trustees, is a worldwide collector of cycads and the owner of the largest known private cycad collection. Mr. Whitelock serves as an advisor for the Arboretum's Prehistoric and Jungle Garden.

Oil painting by H. H. Cross of "Lucky" Baldwin, his daughter, Anita, and pet mastiffs, circa 1888. The recently completed Queen Anne Cottage is seen in the background.

Rancho Santa Anita

Sandy Snider

VISITORS to the Los Angeles State and County Arboretum nod appreciatively at historian H. H. Bancroft's description of this " . . . ideal region, calm and peaceful as the fabled realm of Rasselas, where soft vernal airs induce forgetfulness of the din and turmoil, the crowded streets and selfish intensity of city life." Bancroft's rhapsodic prose, as applicable today as when it was written in 1891, is testimony to the dreams, the tenacity, and the untrammeled enthusiasm of Rancho Santa Anita's most colorful owner — Elias Jackson "Lucky" Baldwin.

Born in 1828, the son of a Hamilton, Ohio preacher-farmer, E. J. early in life demonstrated a flair for the game of "American Capitalism." At the age of twelve, young Elias arranged with his father to drive the family hogs to a Cincinnati market for slaughter (a four week journey). Elias was to give the family all proceeds from the sale up to 160 pounds per hog, with any profit from excess weight to be reserved for himself. Shrewdly investing in a large sack of salt along the way, Elias waited till the night before delivery to set his feast before the hogs, then again waited patiently as the thirsty animals drank enough water to temporarily send their weight well above the 160 pound figure the following morning.

With a personal profit of $32, the budding entrepreneur bought gifts for his family, a new rifle for himself, and an investment in a horse that three months later yielded a 100 percent profit. Having thus established a pattern of reasoned investment, of timely buying and selling, Baldwin's business ventures changed only in scale and complexity over the years. From the hogs and farm horses of his youth, E. J. eased into mining shares and real estate; from doubling a few dollars investment in a horse, he learned to manipulate thousands and occasionally millions of dollars in stocks and mortgage policies.

Severing his midwestern roots for the more lucrative promises of 1853 California, Baldwin arrived in San Francisco too late for the big profits of the Gold Rush,

but in ample time to establish a reputation as a wise and usually ruthless investor (hotels, brickyards, livery stables) who continually proved the wisdom of his oft-stated business philosophy: "To be a success, you've got to keep your eye on two ends—when to go in and when to go out —and don't waste any time doing either."

When news of the Comstock Lode (Nevada silver mining) struck San Francisco in the early 1860s, Baldwin waited and watched and studied while others ran off to the mines. When he went "in," it was to invest in mining shares, not in a pick and shovel, and in a short while his carefully orchestrated system of buying and selling began to pay off in quite handsome profits. A killing on some Ophir shares alone netted him a clear five million dollars (a 500 percent profit on his total investment) and set the stage for a flamboyant entry into an unsuspecting Southern California.

By now popularly nicknamed "Lucky" (many stories, all hazy, surround the origin of the name), Baldwin had decided to personally investigate rumors of good property available near Bear Lake in the San Bernardino Mountains. After a miserable night in Los Angeles, E. J. set out early for Bear Valley on a ride that took him through the heart of Rancho Santa Anita. Lovely at any time, the rancho seemed to have a special glow of health and promise after the dusty squalor of Los Angeles.

With a farmer's eye for good soil and perhaps a sixth sense about land values, "Lucky" Baldwin determined he would soon make the Santa Anita his own. In 1875, backed by millions in cash reserve, Baldwin offered owners Harris Newmark and associates a generous $150,000 for the 8,000 acre ranch (Newmark had paid $85,000 for the land three years earlier). An intrepid Newmark demanded $175,000 and, taken aback, E. J. balked. When, after businesslike consideration, Baldwin decided to pay the $175,000, he was boggled by Newmark's new demand of $200,000. Recognizing that he had already violated his business philosophy by not "going in" quickly enough, E. J. grudgingly paid the $200,00 which, at $25 an acre, became the largest real estate transaction ever recorded up to that time in Los Angeles.

Elias Jackson "Lucky" Baldwin thrived on the challenge of largeness and basked in the glow of superlatives. Under his ownership, Santa Anita not only reached its full potential as a working ranch, but also metamorphized into one of the show places of Southern California. "The scene is one of fairy-like loveliness;" wrote Bancoft, "not only the little bijou residence (Queen Anne Cottage) and its surroundings, but the entire estate, with its groves and vineyards, its golden fruit and waving harvest, its shaded drives and vistas of mountain peak and valley . . ."

Though Baldwin personally spent little time on the ranch in the early years of his ownership, he funneled in money at a phenomenal rate and, through manager Dick Kelly, issued explicit directions for ranch improvement. Some three hundred Chinese, Mexican, and American laborers were hired and housed at such economical rates—Chinese received $1 per day, Mexicans $25 per month plus board, Americans $35 per month plus board, and manager Kelly a mere $60 per month — that Baldwin could carry out his plans quickly and efficiently.

Orders for tree plantings, for orchards and groves, for reservoir building, well digging, and irrigation systems were issued; water rights in Sierra Madre Canyon were purchased and dams and conduits were planned for the conservation and distribution of water. A large grove of English walnuts (one of the first in Southern California) was set out, and an

extensive vineyard that was to become the basis of prize-winning Baldwin wines and brandies, was begun. The old adobe house of Hugo Reid, with its various and sun-dry additions, was renovated still further by Baldwin to serve as a quite comfortable, thoroughly modern eight-room ranch house for himself, while across the lake a gay red and white gingerbread or Queen Anne style guest house was constructed for visiting friends and business associates. Surrounding the homesite were exotic gardens, well-tended lawns, shaded walks and decorative fountains, plus, for animal lovers, a well-stocked deer park and numerous peafowl (descended from three pair Baldwin had originally brought over from India).

That 8,000 acres was not nearly enough land to support E. J.'s plans and dreams was apparent to all who knew him or of him, and when the opportunity to acquire additional property on mortgage foreclosures presented itself, the businessman in Baldwin raised its head. During a financial crisis in 1785, the Temple and Workman Bank of Los Angeles had been forced to suspend operations till additional monies could be found. Baldwin agreed to lend the owners $210,000, but he secured the loan with a blanket mortgage on the properties of both Temple and Workman and their friend Juan Sanchez. The bank failed, despite the loan, and after admirably allowing the mortgage to run almost to the statute of limitations, Baldwin foreclosed. Temple suffered a stroke and a lingering death, Workman committed suicide, Sanchez died a poor man, and "Lucky" Baldwin acquired some 54,000 acres of the San Gabriel Valley (Sanchez's 2,300-acre Rancho La Merced, 4,600-acre Rancho Portrera Grande, and 4,000-acre Rancho de Philip Lugo, plus Temple and Workman's 40,000-acre Rancho La Puente). Now a landowner of note, Baldwin's holdings in the San Gabriel Valley stretched from the Sierra Madre Mountains on the north to the Puente Hills in Whittier on the south and from just west of East Pasadena (near Cal Tech.) to the Merced Hills on the east.

From the homesite at Santa Anita, E. J. oversaw a ranch almost unequaled for variety of products. The Baldwin Ranch at its height boasted 500 acres of orange groves with over one million young trees in the nursery; 3,000 English walnut trees; large groves of lemons, almonds, pears, peaches, apricots, prunes, figs, persimmons, and olives; experimental camphor, pepper, coffee, and tea plants; and a grape crop that produced 384,000 gallons of wine and 55,000 gallons of brandies yearly (the Baldwin winery still stands on the hill overlooking the west turn of the Santa Anita Racetrack). Agricultural experimentation was a favorite activity on the ranch and ran the gamut from pomegranates and bananas to potatoes, asparagus, tobacco, hops, and cotton. Grains and alfalfa were produced in high yields to help feed 33,000 sheep, 3,000 head of cattle, large dairy herds, hundreds of registered hogs, and 500 horses, seventy some odd of which were pampered, specially housed, lavishly cared-for thoroughbred racers (the red and black Baldwin racing colors made turf history at every track in the nation).

"Lucky" Baldwin was rightfully proud of his accomplishments at Santa Anita, and as the years went by the ranch continued to produce both edible and inedible dividends. National recessions took their toll on his finances, however, and throughout his last thirty years Baldwin was constantly land rich and money poor. Almost continually pressed for cash, it was during this period that he developed a reputation for never paying a bill without pressure. Employees, it was noted, were paid "more regularly with promises than with cash."

The boost that probably saved Baldwin from financial collapse was the unprecedented real estate boom that struck Southern California in the 1880s with the coming of the railroads. With the still sure hand of a successful businessman, Baldwin contracted with Sante Fe to build its line into Los Angeles across the Santa Anita property. An "incidental" provision, that all passenger trains should stop on his signal at his ranch station (the Santa Anita Depot has been restored on the Arboretum grounds) was included not so much as a personal power play, but rather as a stimulant to buyers of the tracts of land he hoped to sell.

Having earlier observed the promotional methods of Nathaniel Carter (founder of Sierra Madre) and William Monroe (founder of Monrovia), Baldwin had come to the realization that the profit to be had in selling individual town lots far exceeded the possibilities in selling land wholesale. Thus, with the enthusiasm and thoroughness now recognized as typical of the man, Baldwin created the town he forthrightly named Arcadia.

"This land," he advertised, "including water, in 5-to 20-acre tracts, clear and ready for the plow [costs] $250 to $400 an acre." When accused of charging too high a price for unimproved land, Baldwin is said to have replied, "Hell! We're giving the land away. It's the climate we're selling." Exhibiting as masterful a hand in real estate promotion as he had over the years shown in other avenues of business, the Baldwin ad continued, "Epidemic diseases, poisonous insects, tornadoes, cyclones, earthquakes and thunder storms are practically unknown. An average of more than 300 sunny days makes it possible to work in the open air without injury to health."

Elias Jackson Baldwin, the man of many callings, was nearing his seventh decade when he laid out the town of Arcadia. His interests had shifted over the years, and now in his later life he turned full and undivided attention on his beloved Santa Anita. Life was peaceful, in fact *too* peaceful at the ranch, and though Baldwin enjoyed entertaining guests (especially the young ladies who came so often), he nevertheless was on a constant lookout for adventure.

In 1903, Baldwin adroitly engineered the incorporation of the city of Arcadia and installed himself as mayor. Heading the fledgling city was, typically, a means to an end for businessman Baldwin, for his eye was now on the possibility of building and operating his own race track on his own property with the tax base of a city he had created with his own contrivance. In December, 1907, the Santa Anita Racetrack was opened (on the site of present Arcadia County Park) to 20,000 spectators. "I desire no other monument," said Baldwin. "This is the greatest thing I have ever done, and I am satisfied."

Fourteen month later "Lucky" Baldwin died in his lakeside home at the ranch, bringing to a close the longest and most important chapter in the story of Santa Anita. Under Elias Jackson Baldwin, Rancho Santa Anita reached its peak in acreage, in productivity, and in variety of output. Its fame was such that it elicited frequent tribute, as witness these final words of praise: "It is a spot whose attractions, both natural and artificial, it would be difficult to exaggerate, and we know not whether most to admire its vast extent, the magnitude and diversity of its interests, the beauty of its situation, the skill with which its various operations have been planned, or the well-nigh perfect generalship with which they have been executed."

Sandy Snider is an assistant in the historical section at the Arboretum.

A Landfill Botanic Garden

Armand Sarinana

As the progress of the landfill completion at South Coast Botanic Garden edged steadily westward, the color of the area also changed from the white of diatomaceous earth to the speckled green of new plant growth. The smooth contoured lines were also being changed as small trees and shrubs began to grow.

The eastern part of the garden with its original landscaping continues to be the most densely planted and the favorite area of the visiting public. As stated in the previous article, 80 percent of the original plantings have survived. It has been an uphill struggle, however, because other factors besides those mentioned in previous articles—diatomaceous earth, high soil temperatures, and water drainage problems—have had a restricting effect.

Frosts, which at times have swept through the garden with temperatures as low as 24 degrees, have done widespread damage to immature plants. Damage ranging from minor leaf burn to fatal twig and branch dieback has resulted in the elimination of many plant species. Recovery periods from frost damage have ranged from one to ten months depending on the nature and tolerance of the damaged plants. Another restricting factor to the new landscaping at South Coast was the irregular irrigation brought about by not enough sprinkler lines, and later, sprinkler-line damage due to subsidence caused by trash decomposition.

Today many of the earlier planted trees form the distinguishing characteristic of this eastern portion of the garden. One of the most attractive from mid-June through November is the giant thevetia (*Thevetia thevetioides*) with its beautiful yellow blossoms. Planted in 1962 in the horseshoe lawn area, it has flourished and become the outstanding feature of this area.

Thevetias belong to the dogbane (Apocynaceae) family, which also includes the carissas (*Carissa macrocarpa* or Natal plum), the plumerias, with their showy blossoms, the oleanders or neriums, and even the attention-getting vines, the beaumontia or herald's trumpet. Thevetias are small evergreen shrubs and small trees which flourish from tropical Mexico south to Paraguay, consisting of ten species that prefer heat and are very susceptible to frost. The bright-yellow, 2- to 3-inch funnel-shaped blossoms are evident from June through November here at South Coast.

Traveling north on the unpaved road parallel to Rolling Hills Road, the cactus garden extends upward towards the parking area. South Coast is especially rich in

Cactaceae with 23 genera, 61 species, and 13 varieties. This collection, started in 1961, has flourished and become a visitors' favorite.

At the northeast boundary of the garden on the slope facing Rolling Hills Road is another original favorite whose pink blossoms are spectacular. This is the floss silk tree (*Chorisia speciosa*) planted in 1962. It is one of a number of successful grafts produced by George Lewis, a nurseryman-propagator on the Arboretum staff in 1959 and today the superintendent of Descanso Gardens. Chorisias vary a great deal when grown from seed, hence the grafting project which produces superior trees. The Department has selected a number of clones from this project, among them 'Los Angeles Beautiful' and 'September Splendor'. The fine specimen at South Coast has yet to be named.

The chorisia belong to the *Bombacaceae* or Bombax family, which consists of 20 genera and 150 species of trees in tropic areas throughout the world. A family of diverse characteristics, the genus *Bombax* has lint in the pods used for the kapok fiber; the genus *Ochroma* is the source of commercial balsa wood.

At the top of the northeast slope, the giant elephant or umbu tree (*Phytolacca dioica*), planted in March 1962, dominates the area. Though the color and blossom of this tree is insignificant, its size is very impressive and the collection of 19 hibiscus varieties at its perimeter make this a favorite resting spot. The umbu tree, also called La Bella Sombra (Beautiful Shade), is native to Argentina where shade trees are greatly appreciated. It is a fast-growing, evergreen, soft-wood tree reaching heights of 60 feet and similar widths. Our specimen at South Coast is small compared to Huntington Gardens' specimen in San Marino, but is still impressive with its 6-foot-diameter base. Belonging to the pokeweed family, Phytolaccaceae, with its 17 genera and 110 species of herbs, shrubs or trees native to tropical and subtropical American and South Africa, this tree is a unique specimen at South Coast.

Another part of the early landscaping much in evidence today, though now reduced in size by more current landscaping, is the hybrid bermuda lawn planted in 1966 in a 14-acre area. Three different early hybrid varieties, all successful, are featured: Tifgreen (Tifton 328), Tifway (Tifton 37 and 419), Royal Cap (RC-145).

In 1972, 5 of these 14 acres were converted to a ground cover demonstration area. The color added to this large area has given a new character to the garden. The makeup of these plots is dominated by Department introductions such as South African trailing daisy (*Osteospermum fruaticosum*), cape weed (*Arctotheca calendula*), 'Sunburst' and 'Sungold' gazanias (*Gazania rigens*). Other more common ground covers and plants familiar to the home gardener are also included, among them different varieties of ivy geranium, hemerocallis, agapanthus, and periwinkle.

South Coast added its own plant introduction to the Southern California landscape in April 1967 when a new golden marguerite was discovered. Named *Chrysanthemum frutescens* 'Palos Verdes', this plant is found throughout the garden in almost constant bloom except in December and January.

Possibly the most spectacular sight in the garden in late February and March is the Yata Memorial collection of 565 deciduous flowering trees. Donated in 196- by Mr. Keiji Yata in memory of his father, the main mass of approximately 300 trees is located west of the paved tram road adjacent to the meadow. The color scheme can be described as early pinks and red followed by whites, late

Cactus collection at South Coast Botanic Garden in 1968, after five years of growth.

Beginning of Yata flowering deciduous orchard (foreground); site of lake (center); and beginning of pinetum (background).

reds and variegated peppermints and terminated by the large flowered pink 'Helen Borcher's' peach. In addition, the rich color of purple leaf plum varieties such as *Prunus cerasifera* 'Atropurpurea', *P.* 'Krauter Vesuvius', and *P. blireiana* adds to this rainbow.

A small representative deciduous fruiting orchard was planted in 1973-1974 directly east of the meadow and the deciduous flowering orchard. The purpose was to exhibit the similarities and differences in both types of trees to the visiting public. This orchard is to be used as a pruning demonstration area in January in the Department's Sunday lecture-demonstration series. This small collection consists of five varieties of apples, four varieties of peaches, two of nectarines, four varieties of apricots and pears, two varieties of figs, three varieties of almonds, and two varieties of plums. Several dwarf varieties of peaches and plums divide both orchards. Additional varieties of berries are planned.

Another successful horticultural collection is the pinetum, started in 1965 and completed in 1968. Though consisting of only 17 species, it is an important part of South Coast. The main grouping is located on the hill east of the stream but specimens are found throughout the garden. At an elevation of approximately 350 feet above sea level, this main group is in a rather reduced smog area which accounts for their very healthy condition. The most prominent and numerous of the seventeen species of pines in the garden are the Canary Island pine (*Pinus canariensis*), Monterey pine (*Pinus radiata*), Aleppo pine (*Pinus halepensis*) and the Italian stone pine (*Pinus pinea*).

Some of the other species prominent in the garden are the Mexican pinon pine (*Pinus edulis*), Coulter or big cone pine (*Pinus coulteri*), Japanese red pine (*Pinus densiflora*), Jeffrey pine (*Pine jeffreyi*), Bishop pine (*Pinus muricata*), Austrian black pine (*Pinus nigra*), and Japanese black pine (*Pinus thunbergii*).

Other collections which have also flourished in this Mediterranean-like environment are the ficus group consisting of approximately 15 genera. They are divided into two main sections, one on the east slope facing Rolling Hills Road, planted in 1965-68, and the second facing Crenshaw Boulevard, planted from 1968 through 1970. This group consists primarily of the large tree forms such as the rubber tree *(Ficus elastica)* and Indian laurel fig *(Ficus retusa)*. The eastern collection is more exotic with its bo tree *(Ficus religiosa)*, rustyleaf fig *(F. rubiginosa)* and Moreton Bay fig *(F. macrophylla)*.

The palm collection of 16 genera and 29 species, though massed primarily in the northwest part of the garden, does have specimens throughout the garden. Since palms do so well here, we anticipate enlarging this collection. Future plans call for developing the remaining 20-plus acres on the west side of the garden. This area will complement the new buildings and entrance on Crenshaw Boulevard and also contain a picnic area for visitors. The new bougainvillea section must be further developed on the stream's west slope, a fuchsia collection is anticipated, a small native section will be restored in the north part of the garden, and a possible berry collection will be added to the deciduous fruit orchard. The main objective, then, is develop this garden into a unique plant display without duplicating the fine plant characteristics of the Arboretum and Descanso Gardens.

This is another in a series of articles by Armand Sarinana, superintendent of South Coast Botanic Garden, tracing the origin and development of that garden.

South African section, Los Angeles State and County Arboretum

An Arboretum is for people . . .

Visitors to the Los Angeles State and County Arboretum learn they can have flowers blooming in their garden throughout the year if they select the right plants. Two examples for spring are aloes and lampranthus, seen in the photograph above growing in the Arboretum's South African section. These succulents will bloom for 6 to 8 weeks or longer and are among the many easy-to-grow plants from other parts of the world that help make our urban environment more attractive.

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BOOKSHELF

Recent acquisitions to LASCA Plant Science Library:

AIR POLLUTION EFFECTS ON PLANT GROWTH, Mack Dugger, ed. American Chemical Society, Washington. 1974. 150 p.

AMERICAN INDIAN FOOD AND LORE, Carolyn Niethammer. Macmillan, New York. 1974. 191 p. Black and white illustrations.

CACTI, Frank D. Venning. Golden Press, New York. 1974. 160 p. Color illustrations.

CALIFORNIA MUSHROOMS; a field guide to the boletes, Harry D. Thiers. Hafner Press, New York. 1975. 261 p. Color microfiche illustrations.

COLOR IN THE SKY, Edwin A. Menninger. Horticultural Books, Stuart, Fla. 1975. 260 p. Black and white and color illustrations.

COLORFUL CACTI OF THE AMERICAN DESERTS, Edgar and Brian Lamb. Macmillan, New York. 1974. 236 p. Color illustrations.

THE DICTIONARY OF HOUSE PLANTS, Roy Hay and others. McGraw-Hill, New York. 1974. 224 p. Color illustrations.

FIRE AND ECOSYSTEMS, T. T. Kozlowski and C. E. Ahlgren, eds. Academic Press, New York. 1974. 542 p. Black and white illustrations.

FLOWERS OF GUATEMALA, Carol Rogers Chickering. Univ. of Oklahoma Press, Norman. 132 p. Color illustrations.

GARDENS ARE FOR EATING, Stanley Schuler. Collier Books, New York. 1975 (1971). 326 p. Black and white illustrations.

HANGING PLANTS FOR HOME, TERRACE, AND GARDEN, John Philip Baumgardt. Simon & Schuster, New York. 1972. 128 p. Black and white ilustrations.

HOW TO CARE FOR SHADE AND ORNAMENTAL TREES, John P. Baumgardt. Intertec Publ. Co., Kansas City, Mo. 1974. 84 p. Black and white illustrations.

KEY TO TREES AND WILDFLOWERS OF THE MOUNTAINS OF SOUTHERN CALIFORNIA, Barbara J. Collins. California Lutheran College, Thousand Oaks, Calif. 1974. 277 p. Black and white illustrations.

PLANT DISEASE, Russell B. Stevens. Ronald Press, New York. 1974. 459 p. Black and white illustrations.

PLANT PROPAGATION: principles and practices, Hudson T. Hartmann and Dale E. Kester. 3rd ed. Prentice-Hall, Englewood Cliffs, N. J. 1975. 662 p. Black and white illustrations.

THE RODALE HERB BOOK; how to use, grow, and buy nature's miracle plants, William H. Hylton, ed. Rodale Press, Emmaus, Pa. 1974. 653 p. Black and white illustrations.

TREES OF SANTA BARBARA, Katherine K. Muller, Richard E. Broder, and Will Beitel. Santa Barbara Botanic Garden, Santa Barbara, Calif. 1974. 248 p. Black and white and color illustrations.

FERNS TO KNOW AND GROW, F. Gordon Foster. Hawthorn, New York. 1971. 258 p. Black and white and color illustrations.

FLOWERS OF THE SOUTHWEST DESERTS, 8th ed., Natt N. Dodge. Southwest Parks and Monuments Assn., Globe, Ariz. 1973. 113 p. Black and white and color illustrations.

FUNGAL PATHOGENICITY AND THE PLANT'S RESPONSE, R. J. W. Byrde and C. V. Cutting, eds. Academic Press, London. 1973. 499 p. Illustrations.

GARDENING FOR THE HANDICAPPED, Betty Massingham. Shire Pubications, Ayesbury, England. 1972. 59 p. Ilustrations.

GROWTH AND DEVELOPMENT OF TREES, T.T. Kozowski. Academic Press, New York. 1971. 2 v. Ilustrations.

GUIAS BOTANICAS DE EXCURSIONES EN MEXICO, Sociedad Botánica de México. 1972. 284 p. Ilustrations.

THE HABITAT GUIDE TO BIRDING, Thomas P. McElroy, Jr. Knopf, New York. 1974. 257 p. Illustrations.

A HISTORY OF LANDSCAPE ARCHITECTURE — the relationship of people to environment, George B. Tobey, Jr. American Elsevier, New York. 1973. 305 p. Ilustrations.

HUMAN POISONING FROM NATIVE AND CULTIVATED PLANTS, 2nd ed., James W. Hardin and Jay M. Arena. Duke Univ. Press, Durham, N.C. 1974. 194 p. Black and white and color illustrations.

MYCOPLASMA-LIKE AGENTS OF HUMAN, ANIMAL, AND PLANT DISEASES, Karl Maramorosch, ed. New York Academy of Sciences, New York. 1973. 532 p. Illustrations. (Annals of the N.Y. Academy of Sciences, v. 225)

PATTERNS IN PLANT DEVELOPMENT, Taylor A. Steeves and Ian M. Sussex. Prentice-Hall, Englewood Cliffs, N.J. 1972. 302 p. Illustrations.

PHOTOSYNTHESIS, PHOTORESPIRATION, AND PLANT PRODUCTIVITY, Israel Zelitch. Academic Press, New York. 1971. 347 p.

CASSIA SPLENDIDA (Cover)

A number of cassias have proved to be successful in the Los Angeles County area and have been introduced by the Department of Arboreta and Botanic Gardens. Five species have been made available to the nursery trade and four are being investigated for their potential value.

Cassia splendida first came to the Arboretum in 1951 when Elmer Lorenz shared seed with the Department. Dr. Samuel Ayres, Jr., added another plant to the collection in 1959. It is one of the more spectacular cassias because of the large size of the individual flowers and the deep butter-yellow color.

The plant originates in Brazil and is a dense, rounded shrub or small tree to 15 ft. in height. Leaves are compound—even pinnate—consisting of four leaflets. The yellow flowers appear in terminal clusters in late summer or early fall. The Arboretum propagated plants by cuttings in 1966 and subsequently in May of 1967 the plant became an Arboretum introduction. In that year plants were given to Cal Poly at San Luis Obispo and a large specimen was made available for use in the Civic Center Mall planting. This is perhaps one of the most spectacular of the many cassias that have been made available to the homeowner by the Los Angeles State and County Arboretum. Specimen plants of **Cassia splendida** may be found in quadrants J9 near the Youth Education center and Q14 atop Tallac Knoll.

ARBORETUM WEATHER

Lat. 34 deg. 08' 48" N.
Long. 118 deg. 02' 59" W.
Elev. 571.28 ft.

Weather season:
Oct. 1 to Sept. 30

	Nov.	Dec.	(1976) Jan.
Average daily maximum temperature	74.6	70.0	74.1
Average daily minimum temperature	44.9	42.5	41.0
Highest temperature	88	88	88
Lowest temperature	33	32	29
Number of clear days	21	22	30
Number of partly cloudy days	9	8	1
Number of cloudy days	1	1	0
Rain during this month	.09	.37	0
Total rain since Oct. 1st	.67	.104	1.04

Calendar

April, May, June

ARBORETUM, Arcadia

Apr. 4—9 to 5 p.m.
Baldwin Bonanza
Presented by Cal. Arboretum Foundation.
Apr. 11—10 a.m.
Sunday Morning Walk*
"Lawns and Ground Covers"
Charles Lee, horticultural consultant
Apr. 17, 18—Sat., 1 to 5 p.m.
Sun., 9 to 5 p.m.
Iris Show*
Presented by S. Calif. Iris Society.
Apr. 24, 25—Sat., 12 to 5 p.m.
Sun., 9 to 5 p.m.
Amaryllis Show*
Presented by S. Calif. Hemerocallis and Amaryllis Society
May 1, 2—Sat. 1 to 5 p.m.
Sun. 9 to 5 p.m.
Rose Show*
Presented by the Pacific Rose Society.
May 9—2 p.m.
Sunday Afternoon Talk*
"Poisonous, Medicinal Plants"
Dr. Leonid Enari, senior biologist
May 16—Sun., 9 to 5 p.m.
Epiphyllum Show*
Presented by Epiphyllum Soc. of America.
May 22, 23—Sat., 9 to 5 p.m.
Sun., 9 to 5 p.m.
Spring Extravaganza*
Presented by Cal. Arboretum Foundation.
May 29, 30—Sat., 9 to 5 p.m.
Sun., 9 to 5 p.m.
Bonsai Show*
Presented by Santa Anita Bonsai Society.
June 5, 6—Sat., 10 to 5 p.m.
Sun., 9 to 5 p.m.
Satsuki & Azalea Show*
Presented by Satsuki and Azalea Society.
June 13—2 p.m.
Sunday Afternoon Talk*
"Decorative Plants from Dinner Leftovers"
Tak Niiya, chief, Education Division
June 20—10 a.m.
Sunday Morning Walk*
"Greenhouses"
June 26, 27—Sat., 12 to 5 p.m.
Sun., 9 to 5 p.m.
Gladiolus Show
Presented by S. Calif. Gladiolus Soc.
*Sponsored by Cal. Arboretum Foundation.

DESCANSO GARDENS, La Canada

April 4—10 a.m.
Sunday Morning Walk*
"California Native Plants"
Dr. Gary Wallace, Arboretum biologist
April 23—8 p.m.
Theodore Payne Foundation Lecture
"Foundation Cactus Garden and Collecting in Barranca Del Cobra, Mexico"
Kathryn Sabo, show chairman, Cactus and Succulent Society of America
May 29, 30—3 p.m.
Square Dance
Sponsored by La Canada Square Dance Group
June 6—9 to 5 p.m.
Hemerocallis Show*
Presented by Hemerocallis Society of Southern California.
June 6—9 to 5 p.m.
Annual Art Festival
Presented by Descanso Gardens Guild
June 13—3 p.m.
"Excerpts from Show Boat"
Presented by Glendale College Players
June 26, 27—3 p.m.
La Canada Players
Works from Shakespeare
*Sponsored by Descanso Gardens Guild

SOUTH COAST BOTANIC GARDEN.

Palos Verdes Peninsula

April 3—1 p.m.
Iris lecture*
John Malone, iris specialist
April 9
Theodore Payne Foundation Lecture**
"Four Seasons of California Flora"
Leona Barnes, nature photographer
May 2—10 a.m.
Sunday Morning Walk*
"Flowering Plants"
Armand Sarinana, superintendent
May 15, 16—8 to 5 p.m.
Fiesta de Flores
Presented by So. Coast Botanic Gar. Fdn.
May 29, 30, and 31—Sat., 12 to 4:30 p.m
Sun., 10 to 4:30 p.m
Mon., 10 to 4:30 p.m.
Cactus and Succulent Show*
Presented by South Coast Cactus and Succulent Society
June 6—2 p.m.
Sunday Afternoon Talk*
"Indoor Container Gardening"
Edward Hartnagel, asst. superintendent
*Sponsored by South Coast Botanic Gardens Foundation
**Presented in cooperation with Department of Arboreta and Botanic Gardens

BIRDWALKS

ARBORETUM
1st Sunday of each month at 8 a.m.
DESCANSO
2nd and 4th Sunday of each month at 8 a.m.
SOUTH COAST
3rd Wednesday of each month at 8 a.m.

June
1976
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Lasca Leaves

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Donald S. Dimond

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Department Notes

SOUTH COAST DEDICATION

As BOTH Department Director Francis Ching and longtime supporter of South Coast Botanic Garden Mrs. Frances Young observed, official ceremonies conducted outdoors at the garden have always been blessed with good weather, no matter how many black clouds preceded the event. At 8 a.m. on Friday, May 7th, there was scattered rainfall in the Los Angeles Basin, including Palos Verdes Peninsula. By 10 a.m., when some 200 guests had assembled for the formal dedication of the new Administrative Center, the sun was shining and the air was fresh and clear. With this good omen, Mr. Cliff Graham, president of the South Coast Botanic Garden Foundation and emcee for the dedication, got the proceedings underway with the pledge of allegiance led by Scout Troop 850 from nearby Manhattan Beach. Then, Dr. Charles Heuser, pastor of The Neighborhood Church of Palos Verdes, which is right next door to the garden, gave the invocation.

Mr. Graham then successively introduced Mr. John A. Anderson, mayor of

Participating in the ribbon-cutting ceremony were, from the left: Marilyn Stoke, president, Board of Governors; John Anson Ford, former county supervisor; Frances Young, founder-president, SCBG Foundation and former member, Board of Governors; Cliff Graham, president, SCBG Foundation; Supervisor Hayes; Mrs. Burton Chace; John Anderson, mayor, Rolling Hills Estate; Assemblyman Robert Beverly; Dr. Paul Saffo, former president, SCBG Foundation; Francis Ching, director, Arboreta and Botanic Gardens.

In the audience for the dedication was Donald P. Woolley, first superintendent of South Coast Botanic Garden and largely responsible for the many plantings now maturing at the garden.

Dr. Paul Saffo, former president of the South Coast Botanic Garden Foundation, expresses appreciation for new buildings to Supervisor James Hayes while Assemblyman Robert Beverly, 46th district, beams his approval of the achievement.

From left, Francis Ching, Mrs. Frances Young; John Anson Ford; Supervisor Hayes; and Assemblyman Beverly, all major contributors to the Administrative Center complex.

Following the dedication ceremonies, the audience, serenaded by a mariachi band, entered the courtyard to begin a tour of the new facilities.

Rolling Hills Estates, Mrs. Marilyn C. Stoke, president of the Board of Governors of the Department of Arboreta and Botanic Gardens, and Mr. Francis Ching, department director. Each expressed appropriate remarks concerning the new center and how it represented the culmination of years of cooperative effort. The dedicatory address was delivered by the Honorable James A. Hayes, supervisor of the fourth county district in which the garden is located. Supervisor Hayes, in addition to expressing his appreciation for the collective effort that helped to bring the center to realization, reminded his listeners that he had "gone out on a limb" in persuading his fellow supervisors to authorize construction of the buildings and hoped that the South Coast Botanic Garden Foundation, the South Coast staff, and the many garden groups and others who would utilize the center, would do so in a way to justify his faith.

After the traditional ribbon-cutting ceremony, everyone was invited to explore the new facilities and partake of refreshments supplied by the Foundation. What they saw was an inner courtyard, the Frances Young Hall of Horticulture, and other rooms that collectively seemed a most inviting place for community functions. Everyone was in agreement that architect Don Hendrickson had provided buildings well-suited to their multiple purposes and, with their subdued pastel colors, tasteful light standards and attractive graphics, in harmony with the surrounding environment.

CALIFORNIA ARBORETUM FOUNDATION ANNUAL MEETING

A FINE SPRING rain greeted the annual meeting of the California Arboretum Foundation last May 5, causing the luncheon to be moved indoors but otherwise causing no disruption or lessening of enthusiasm for everything else on the agenda.

Following a box luncheon in the lecture hall, the business meeting got under way with the election by the general membership of new officers to the Board of Trustees for the regular three-year term. Mr. Warren Dunbar, chairman of the nominating committee which included Mrs. Edward Chapman and Mr. Walter Schoenfeld, presented the candidates. Elected were Mrs. Thomas Moore, Mrs. John Fehrer, Mrs. Varick Martin, Mrs. Dennis Buck, Mrs. Raymond Taylor, and Mr. Roy L. Kackly. Re-elected to their third three-year term were Mrs. Miriam Kirk, Mrs. Chester Williams, Mrs. John Grivich, Mr. Robert Strub, Mr. Ralph Spencer, Mr. Ernest Hetherington, and Judge Joseph Sprankle, Jr.

A report on the activities of Las Voluntarias in the past year was given by Mrs. Thomas Moore, pinch-hitting for Las Voluntarias president, Mrs. John Llewellyn, who was unable to attend. Mrs. Moore was presented with a plaque in appreciation of her accomplishments as past president of Las Voluntarias, among them an increase in membership to the current figure of 3,063.

Other Board members reporting were Mr. D. Ramsay Lawson, on the Hall of Environmental Education, and treasurer Frank Regan who reported that the net profit from the recent Baldwin Bonanza was $33,724, a figure six thousand dollars higher than last year's Bonanza.

Mrs. Leland Larson, first vice-president of the Foundation and a member of the Board of Governors, gave a summary of

Mrs. Leland E. Larson

the many activities at the Arboretum last year.

Director Francis Ching extended his welcome to the members and expressed his appreciation for their support of the Foundation and their invaluable help, particularly Las Voluntarias, in all areas of Arboretum activity.

Special guests at the meeting were Mrs. Marilyn C. Stoke, president of the Board of Governors; Mrs. Mary Bittner, member of the Board of Governors; and Mrs. Nancy Dunn, new president of the Descanso Gardens Guild.

Voted to top offices effective July 1, were Mrs. Leland Larson, president; Mrs. James Curry, 1st vice-president; and Mr. Robert Paradise, 2nd vice-president. Mrs. Larson appointed Mr. Warren Dunbar to the post of treasurer.

Although the rain prevented the running of trams, members had the pleasure of a tour of the new Tropical Greenhouse and then, for the annual plant distribution, had the choice of two plants; *Callistemon pinifolius*, the bottlebrush with

yellowish-green flower spikes, or *Viburnum rigidum,* a species that does better in this area than most viburnums.

NEW GUILD PRESIDENT

MRS. NANCY N. DUNN of Pasadena was elected president of the Descanso Gardens Guild at the Guild's annual meeting last February, succeeding

Mrs. Nancy N. Dunn

Mrs. Rodney Rood who had served a two-year term. Mrs. Rood will automatically become a member of the Guild Advisory Board and will also serve on a number of committees. During her long association with Descanso Gardens, which extends over twelve years, Mrs. Dunn has directed most of her efforts toward the development of the Guild's corps of volunteers. She is credited with forming the first docent program at Descanso in 1965. In addition to serving as chairman of this program, she has served on numerous other community agencies, among them the Sierra Madre Girl Scout Council, the Pasadena branch of the NAACP, and the Washington Girls' Project under the Community Planning Council.

Mrs. Dunn is currently a member of the Descanso Gardens Guild Board of Trustees and the Red Cross Youth Advisory Committee in Pasadena. She is also a member of the Junior League.

After raising six children, Mrs. Dunn earned a B.A. degree at Occidental College in 1974 and is now working on a Master's degree in sociology at Cal State, Los Angeles.

Among the projects Mrs. Dunn hopes to see completed during her term of office are a new classroom and exhibit hall for lectures and flower shows, completion of a plant reference library in the Hospitality House, and further development of the Tuesday Gardens Tours.

New officers serving with Mrs. Dunn are Mrs. Lelamae Adams, vice-president in charge of the Project Board; Mrs. Merideth Wills, second vice-president; Mrs. Gerald J. Wells, recording secretary; Mrs. Melvin D. Burt, corresponding secretary; and Mrs. Jack Danz, treasurer.

AMERICAN ASSOCIATION OF BOTANICAL GARDENS AND ARBORETA AWARDS PRESENTED

DR. MILDRED MATHIAS, recently retired director of botanical gardens herbarium and professor of botany at UCLA, and for many years a trustee and currently an honorary trustee of the California Arboretum Foundation, has been presented with an Award of Merit by the American Association of Botanical Gardens and Arboreta for her many achieve-

ments in the world of botany and horticulture. The presentation was made by the Association at its 1976 annual meeting in Wilmington, Delaware.

In presenting the award, the AABGA took notice of Dr. Mathias's academic training, which includes A.B., M.A., and Ph.D. degrees from Washington University in St. Louis; several positions at the University of California at Los Angeles, which include vice-chairman and then acting chairman of the department of botany, twelve years as director of botanical gardens, and the positions from which she has just resigned; her long list of publications; and her service on behalf of numerous professional organizations.

Included in the latter is her service as president of the Southern California Chapter of the Nature Conservancy, consultant to the University's Folklore and Mythology Group, member of the University's Committee to Administer the Curriculum in Biological Illustration, consultant to the department of pharmacology, member of the General Committee for Nomenclature of the International Association of Plant Taxonomy, and member of Panel IV in the Japan Cooperative Science program of the National Science Foundation.

The AABGA took particular note of Dr. Mathias's contributions as a member of the Advisory Committee of the Huntington Botanical Gardens, the Advisory Committee of the Davis Arboretum, and as a member of the Board of Directors of the Los Liones Arboretum.

Besides Dr. Mathias, the AABGA presented Awards of Merit to Mr. John E. Voight for his leadership in making the Boerner Botanic Gardens in Milwaukee an "institution nationally known for its high standards of taste and maintenance." Mr. Voight is a former president and director of AABGA, was general chairman for The National Convention of the American Horticultural Society in 1971, and has generally over the years given much time and energy to horticultural organizations.

Dr. Mildred Mathias

An Honorary Life Membership, the highest award bestowed by the AABGA, was presented to Dr. Fred Bixler Widmoyer, Jr., "in recognition of his long standing devotion to our organization. Soon after Dr. Widmoyer joined the AABGA in 1959, he began a strenuous two-year stint as a pioneering editor of our Bulletin, and in 1962, he became secretary-treasurer. For the past fourteen years, he has faithfully attended the grinding cycle of meetings and lavished energy upon many inglorious tasks. He has worked hard, but more importantly, he has worked reflectively. During the execution of numerous day-to-day duties, he has managed to keep an eye on the

future of our organization and to guide us toward that vision."

And finally, an Award of Merit was presented to the Pennsylvania Horticultural Society, under its president, Ernesta D. Ballard, "in recognition of its many bicentennial projects for the public good through horticulture."

W. QUINN BUCK

THE HORTICULTURAL community, the Arboretum and other area botanic gardens lost a longtime friend and contributor with the passing of W. Quinn Buck last February 29 at his home in Arcadia. Mr. Buck was 67 when he died and had devoted the last 25 years of his life to the world of plants, centering his attention on plant propagation and, in particular, on developing new kinds of daylilies.

As a youth in his native Texas, he was exposed to the journalistic world through a weekly newspaper published by his father and to the world of plants simply by the flower gardens he saw, every one of which fascinated him. He majored in English and art at Texas Christian University in Fort Worth and, following graduation, *summa cum laude,* in 1929, went to Philadelphia to study painting at the Pennsylvania Academy of Fine Arts. It was while working nights as a proofreader on The Philadelphia Inquirer that problems developed with his eyesight which were to force him, six years later, to leave the field of journalism and give up printing permanently. Oculists advised him to live in a warmer climate, and so he moved to California. During his student years he had always found time to attend horticultural lectures and experiment with growing plants, so that when he came to California he already had both experience and technical knowledge in plant propagation.

He arrived in California early in 1942 and worked for a year with Cecil Houdyshel, a bulb grower in La Verne. Then, he went to work as a technician in the floriculture greenhouses at UCLA, where he remained for seven years. He became the head plant propagator at the Los Angeles State and County Arboretum in 1950 and held this position until his retirement in 1965.

In 1951, he established the first test garden at the Arboretum. It consisted of over 200 named varieties of daylilies and reflected his experiments at the Arboretum, and in later years at his home, in the production of tetraploid daylilies (plants having twice the normal complement of chromosomes in their cells) and other ornamental plants through the use of the chemical colchicine. His successes in this area resulted in the production of new races of garden daylilies having superior form and lasting qualities. A colchicine-induced tetraploid blue daisy, *Felicia amelloides* 'Santa Anita', obtained from his 1951 experiments, was given an Award of Merit by the California Horticultural Society and was commercially propagated by the thousands for use in the Los Angeles and San Francisco areas.

In 1969, the American Plant Life Society presented Mr. Buck with the Society's William Herbert Medal in recognition of his outstanding contributions toward advancement of plants in the amaryllis family, particularly for his pioneer work of the tetraploid daylilies. Many of his plant creations are growing today at Descanso Gardens, South Coast Botanic Garden and the Arboretum.

Mr. Buck was a member of numerous horticultural societies and was an active participant in the American Plant Society, American Hemerocallis Society, San Gabriel Valley Orchid Hobbyists, and the Southern California Hemerocallis and Amaryllis Society.

PLANT PORTRAITS

Washingtonia Robusta

The Mexican Fan Palm

David Deardorff

IT IS SOMEHOW fitting in this bicentennial year for a plant-portrait article to highlight a species in a distinctive genus of ornamental fan palms named after the "father of our country". The genus is *Washingtonia;* it is comprised of just two species: *W. filifera,* the only palm native to the western United States, and *W. robusta.*

The name *Washingtonia* was used by Rafinesque in 1818 for sweet cicely, a genus of herbs in the carrot family. Later on it was used by Wendland for the fan palms and was also once used for the sequoias. According to the International Rules of Botanical Nomenclature, no two genera may have the same name, and the oldest validly published name has priority. Since Rafinesque used the name before anyone else, sweet cicely, not the fan palm, should be named *Washingtonia.* Nearly a hundred years later, however, Parish prepared a taxonomic monograph of the fan palms (Bot. Gaz. 44: 408-434. 1907.). In this study, he decided that the fan palms should retain the name *Washingtonia.* He made this decision based on what he considered to be sound nomenclatural grounds and also the fact that by this time the use of the name for the palms was solidly entrenched in the literature and in the nursery trade.

Washingtonia robusta, the Mexican fan palm, is native to northwestern Mexico and may have been introduced to California as early as the eighteenth century by the mission fathers. It has been noted that Prudhomme grew this palm at his home near San Gabriel and apparently obtained his plants from the mission there. The Mexican fan palm was not extensively planted, however, until around 1870. E. J. Baldwin introduced it in his Rancho Santa Anita in the 1890's. This planting still exists near the Queen Anne Cottage on the grounds of the Los Angeles State and County Arboretum. Several of these magnificent old palms exceed 100 feet in height and one tops

A grove of WASHINGTONIA ROBUSTA *adjoining the historical section at the Los Angeles State and County Arboretum.*

them all at 121 feet. This grand old palm at the northeast corner of the Queen Anne Cottage may well be the tallest palm in the continental United States.

Under ideal conditions of good drainage, ample soil moisture, and fertile soil, the Mexican fan palm gains an average of two feet per year in height. At least one record reports a vigorous growth rate of six feet in a single year. It is apparently the ultimate height of the Mexican fan palm which earned it the specific epithet of *robusta,* since in every other respect it is smaller and more graceful than the relatively massive California fan palm, *W. filifera.* The smaller leaves, smaller crown, and narrow trunk of the Mexican fan palm result in a graceful habit which is accentuated by the extreme heights it can reach.

The leaves of the Mexican fan palm are palmately divided, the divisions extending about one-third of the distance to the base of the blade. The leaves are as much as four feet long, including the stout spiny petiole, and are persistent for several years. The functional life of the leaf is about one year after which it dies and becomes reflexed, dangling down around the trunk in a skirt or petticoat of thatch. The skirts of old leaves persist for years unless pruned away deliberately or removed by wind or fire. When the dead leaves are deliberately pruned, the leaf bases which remain form a very attractive basket-weave texture for much of the length of the trunk.

The flowers of the Mexican fan palm are small and whitish, borne in large inflorescences which hang down below the leaves. The fruits are small blue-black drupes with a large seed and very little flesh. The seeds germinate readily and small seedling fan palms often spring up abundantly around reproductively mature trees.

The native Americans of the southwest utilized the California fan palm in a variety of ways and, although no specific information seems to be available for the Mexican fan palm in this regard, it may have been used in a similar fashion. The fruits were roasted and eaten or were ground into flour. The trunks were squared off and used as timbers or were split into poles for ramadas and corrals. The leaves provided thatch for roofs and fibers to bind the thatch in place. Thus it may have been for partly utilitarian rather than strictly ornamental purposes that the Mexican fan palm was originally imported by the mission fathers.

Whatever the original reasons for its importation, the Mexican fan palm is highly regarded today as a hardy, adaptable, ornamental palm performing well under a wide variety of climatic and cultural conditions. The plants are hardy to 24 degrees and will withstand drought and poor soil, although growth is faster under better conditions. The most widely planted palm in southern California, the Mexican fan palm is now cultivated in Mediterranean and subtropical regions around the world. It is certainly the most abundant tree in the urban landscape of southern California, dominating the skyline of cities and towns from the coast to the desert. It is a stately street tree and, especially when silhouetted against the setting sun, is quite capable of transforming the most mundane urban landscape into a panorama of genuine beauty. Even more than most trees, however, it achieves its true potential when planted in informal clumps and groves in a parklike setting. The magnificent grove of Mexican fan palms near the Queen Anne Cottage on the Arboretum grounds is an excellent example of their quiet grace.

Dr. Deardorff is a member of the department research staff involved in taxonomic studies.

Coffee

Leonid Enari

An old Ethiopian legend tells that coffee was discovered by a goatherder and his goats. The herder noticed that whenever the goats nibbled berries and leaves from a certain shrub on the hillside in the evening they pranced happily and noisily around all night giving him no chance for a well-deserved sleep. When he tried some of the berries himself, he became so excited over the resulting alertness and wakefulness that he took a few of the berries to the mullah. The mullah listened to his story, tasted the berries, and decided that they were exactly what he needed to keep the faithful from falling asleep during the long evening services.

In about 800 A.D., coffee was used as food. The whole ripe berries and leaves were crushed and molded into balls held in shape with fat. One of them, about the size of a tennis ball, made up a days ration and sustained a man on a long march. There are a few wandering tribes in Africa who still use them.

The habit of coffee-drinking seems to have started in Arabia in the 15th century. All available evidence suggests that the people of Mocha, Medina, and Bagdad did not know of coffee before this date. Coffee is not mentioned in the Koran, nor is there any allusion to it in the Hebrew Scriptures.

The first beverage made from the berries of the coffee plant is believed to be an alcoholic liquor. The pulp of the berry is succulent and contains a fair amount of sugar. If a decoction made from it was allowed to stand for a short time, it would become alcoholic and might even be distilled into spirit. The beverage made from coffee berries would not only be intoxicating, but also stimulating because of the caffeine in it.

The art of roasting the seeds (beans) and then preparing a decotion from them was apparently a more recent discovery. There is no record of when the process was discovered.

From Arabia, coffee spread to Egypt, Damascus, Aleppo, Persia and then to Europe where coffee houses sprang up in Italy, France, England, Germany and other countries. These European coffeehouses became centers of literary, artistic and political activity. The most famous were found in London in the 17th and 18th centuries. Because of the open and liberal nature of the discussions taking place in these coffeehouses, it was not long before they came under the scrutiny of state and church. In England, in 1675, Charles II tried to suppress coffeehouses on the ground that they were centers of political agitation. The American colonies copied the mother country by establishing coffeehouses in Boston, New York and Philadelphia. The Green Dragon in Boston was one of the most famous. It was a political and social center from 1697 to 1832. Daniel Webster called the Green Dragon "The Headquarters of Revolution." The American coffeehouses, however, never attained the intellectual importance of their European counterpart.

There are about 40 or 50 species of

coffee plants (*Coffea*) in the tropics of the Old World, mainly in Africa. Of these, the Arabian coffee tree (*Coffea arabica*) produces more than 90 percent of the world's coffee. The others of commercial value are the Liberian coffee tree (*C. liberica*), the Sierra Leone coffee tree (*C. stenophylla*), and the Congo coffee tree (*C. robusta*).

The Arabian coffee tree is a shrub which under natural conditions grows to a height of 20 feet but in cultivation is kept between 10 and 12 feet. Its leaves are narrowly ovate in shape, pointed, entire, smooth, shiny and opposite. Its flowers are pure white in color, fragrant, delicate, and are produced in axillary clusters. Each flower has a 5-toothed calyx, 5-toothed corolla, 5 stamens and 1 pistil. Its fruits, known botanically as drupes, are berrylike or cherrylike, assuming a dark-red color when they ripen. Each fruit contains two seeds, less commonly one, which are the coffee beans of commerce. The Arabian coffee tree is indigenous to Ethiopia, the Sudan, Guinea and

Leaves and berries of COFFEA ARABICA.

Mozambique. It is not found wild in Arabia, as has been claimed by early writers.

The first botanist to examine the seeds of the Arabian coffee tree was Clusius, who figured and described them in 1574. He also reported that they were called buna (the Ethiopian name for coffee) and that in Alexandria a drink was made from them.

Coffee trees demand moist climates and fertile, well-drained soils for best growth. The best and most productive coffees are grown in highland habitats 1,000 to 4,000 feet above sea level where constant moderate temperatures and frequent mists seem to benefit the plants.

Up to the close of the 17th century, the entire world's supply came from the province of Yemen in South Arabia where the famous Mocha coffee still is produced. When coffee was introduced to other countries and its growing became wide spread, the Arabian monoply was broken. At present, Brazil grows more than half of the world's crop. Its annual production is about five billion pounds. Other leading coffee-growing countries are Colombia, Ivory Coast, Mexico, Angola, Uganda, Guatemala, Indonesia, El Salvador and Ethiopia.

Coffee is a hand-picked crop. After debris has been removed, the berries are prepared for market by either a dry or wet method. In the dry method, the berries are exposed to sun and wind on open drying grounds and turned frequently. In large plantations, artificial heating methods sometimes take the place of natural sun-drying. The pulp (the succulent outer coat), the parchment (the inner adhesive layer), and the silver skin (the seed-coat within the parchment which adheres closely to the seed), are all removed mechanically by machines. After this is done, the beans are graded by size. From this point on, the beans are known as green coffee. The green coffee is packed approximately 132 pounds to a bag, transported to the nearest seaport, and shipped to coffee-drinking countries. In the second (wet) process, the ripe berries are run with water through a pulping machine which removes the skin and part of the pulp. The fragments of the pulp remaining are removed by controlled fermentation in vats over a 12- to 24-hour period. After washing the beans in running water, they are dried and handled much as in the dry method

C. ARABICA *used as a house plant.*

After the green coffee reaches the country of destination, it is roasted, ground, and packed for market. Green coffee beans do not have any aroma. The marvelous aroma with which we are familiar is produced when the beans are roasted and is partly due to a volatile oil produced at the expense of other substances, and partly to the sugars being caramelized. The rapid cooling, which in good manufacture follows the roasting of the bean, is intended to prevent undue loss

of the volatile oil. At the same time, there is a loss of water and fats, and the cellulose cell-walls are made brittle and brown. Without roasting, the bean could not be ground. During roasting the beans lose 12 to 19 percent of their weight but gain about 30 percent in volune.

Once roasted and ground, coffee loses its aroma and flavor very rapidly so that after ten days most of it has disappeared. About the tenth day the coffee begins to develop a disagreeable flavor we call staleness that grows progressively worse. The only known method of preserving the aroma is by packing the coffee in vacuum cans. Vacuum-packed coffee is always fresh when opened, containing all the delicious aroma of the freshly roasted and ground coffee. Once opened, however, vacuum-packed coffee begins to lose its aroma at exactly the same rate as freshly roasted coffee does.

Each variety of coffee has its own aroma. Most of the brands on the grocery shelves are blends. The blending of coffees is the mixing of two or more varieties in order to get a characteristic aroma that many people like.

The United States ranks as the largest consumer of coffee. Each year the U.S. uses about two billion eight hundred million pounds, or about one-fourth of all the coffee produced in the world. This means about 15 pounds of coffee per each man, woman and child. Other leading coffee-consuming countries are France, West Germany, Italy and Sweden.

The stimulating value of coffee lies in the caffeine, which is present in the bean, partly free, but chiefly in chemical combination. Small doses of caffeine produce wakefulness, take away the feeling of fatigue, promote clear thinking, quicken the pulse, and raise the blood pressure. Larger doses can cause nervousness, irritability, lethargy, insomnia, headaches, palpitation, rapid heartbeat, nausea, vomiting and diarrhea. According to medical researchers, the consumption of more than 6 cups of coffee a day increases the risk of heart attacks to twice that of those who drink no coffee. 250 milligrams of caffeine a day is considered a large dose. An 8-ounce cup of instant coffee contains 105 to 120 mg., and the same volume of prepared coffee 145 to 180 mg. of caffeine. Drinking 3 cups of coffee a day may not seem much if we do not realize that with the coffee we also swallow 315 to 570 mg. of caffeine. Coffee, of course, is not the only source of caffeine we might ingest in our daily lives. There are 95 to 120 mg. of it in an 8-ounce cup of tea, 28 mg. in an 8-ounce bottle of Coca-Cola, and 65 mg. in a tablet of Excedrin.

Coffee trees can be grown indoors as a conversation piece. When a plant becomes too large for the indoor situation it can be planted in a sheltered area outdoors where it will continue to flower and to produce berries. This, of course, is only possible in frost-free or nearly frost-free areas. A heavy crop of berries might even give some people the idea of following the footsteps of early discoverers and trying to produce their own brand of wine or coffee.

The Los Angeles State and County Arboretum has a number of coffee trees in containers and in the ground. The oldest specimens may be seen in quadrants 0/13 and 0/14 (at the very top of Tallac Knoll) where, shaded by taller trees, they have flowered and fruited since the sixties.

The author is much indebted to the approximately 20 cups of coffee that made it possible for him to write this article in two consecutive nights.

Dr. Enari is a senior biologist in the Department's research division, taxonomist, chemist, teacher, and author of a number of textbooks on botany.

The Baldwin Legacy

Sandy Snider

THE LOS ANGELES State and County Arboretum and its almost one million yearly visitors are the beneficiaries of a legacy rich in land and history that extends two hundred years into the past and culminates in the estate of Elias Jackson Baldwin. When this remarkable, Ohio-born entrepreneur died in 1909, his

Elias Jackson Baldwin, daughter Anita, and Anita's two children, Dextra and Baldwin, by Hull McClaughrey, her second marriage.

Santa Anita Ranch, the heart of that legacy, was still near its peak of production and vitality with some 52,000 acres of rich farmland and potential townsites. His will listed an unbelievable 1,691 individual parcels of real estate valued at $10,612,025 plus personal property worth $318,776. Under its terms, the bulk of the landed estate was to be divided equally between his daughter Clara, offspring of his first marriage to Sarah Unruh, and Anita, child of a third marriage to Jennie Dexter; minor bequests were made for the widow, Lillie Bennett (the fourth Mrs. Baldwin), and for a previously unacknowledged daughter identified as Rozella or Zelda Selby (born to Martha Agnes Fowler the year Baldwin married Lillie Bennett).

As was expected with a man of Baldwin's wealth and reputation, the will was contested by numerous claimants, though none of them met with success. In fact, some four years of litigation served only to validate the original will, and in the interim the same good fortune that had earned him the nickname "Lucky" served him once again. Much to the delight of Clara and Anita, by the time of distribution, "Lucky's" properties had skyrocketed in value and were appraised at $10 million above the original estimation, thus doubling the daughters' inheritance. To seal the luck, four years later Baldwin's Merced sheep pasture metamorphised into the Montebello Oil Fields, and in another seven years oil was flowing on the La Cienega Ranch, now known as the Baldwin Hills.

The lake homesite and 3,500 acres immediately surrounding it were jointly owned by the daughters, but soon after disposition of the will, the younger Anita leased Clara's interests and quickly and efficiently organized a livestock ranch, called the Anoakia Breeding Farm as both a memorial to her father's life and as a sound business venture of her own. The Queen Anne Cottage was closed, its marble walkway, black walnut doors, fireplaces and tilework, and its magnificent stained-glass windows carefully crated and stored, as Anita oversaw the construction in 1913 of her own three-story, fifty-room Anoakia home at the corner of present-day Baldwin Avenue and Foothill Boulevard (the name Anoakia was coined by combining the first two letters of Anita's first name, the "oak" tree of the family crest, plus an -ia for euphony).

Completed at a cost of over a quarter million dollars, Anita's Anoakia home was as modern as the Queen Anne Cottage was old-fashioned. The Pasadena *Daily News* of 1915 noted that "a more beautiful spot would be difficult to find. The house is a massive structure of concrete, built on the open square plan, and every room on the lower floor opens with long French windows or doors, into the patio . . . The beautifully kept kitchen, with its white tiles and shining enamel, copper and aluminum ware, presided over by the white coated chef; the immense enamel ice boxes and serving room; the thousand-and-one conveniences that go to make the up-to-date home; the basement with its wine cellars; the ice-making plant, furnaces and storerooms; the stately dining room with paneling to the ceiling and handsome cut-glass fixtures and ornaments—all carved with the oak design by Pasadena people — the dainty breakfast room, light and airy . . . the place is absolutely complete." Art work, almost entirely by Californians, filled the house; of particular note were the four Indian murals executed by Western artist, Maynard Dixon. Beyond the house were tennis courts, gymnasium, a white-tiled swimming pool, Parthenon-style bath house, a garage complete with its own machine shop, terrapin and frog ponds, apiary, aviaries, stables, and the

"Parthenon-style" bathhouse and outdoor swimming pool at Anita Baldwin's Anoakia home.

famous dog kennels housing Anita's prize-winning airedales and Russian wolfhounds.

Animal-lover and businesswoman both, Anita concentrated her energies on stock-raising rather than the general farming of her father's day. In 1915, she had the orange groves and vineyards that had filled the land north of Huntington Drive rooted out to provide more land for pasturage and raising grain feed. Her father's old wooden ranch buildings were

Movie sets were common during the 1940s at the old Baldwin house (above) and Baldwin Lake (Lasca Lagoon) (below).

torn down and replaced with what a writer of the day described as modern structures of "reinforced concrete, with ventilation, sanitary plumbing, and conveniences of every kind, electrically lighted, and steam heated in winter." The dairy barn received special attention: "No expense or care will be too great to provide the best for these fine cows. The milking stalls will be in two parallel rows, twenty-four stalls to a row, facing each other. Between the two, an electric runway will bring in the feed direct from the silos or grain barn. There will not be a board in the place. Every possible harboring spot for vermin will be eliminated so that the cows may be kept as clean and sweet as well-cared-for children. The ultimate intention is to give to Los Angeles and the surrounding cities and towns the opportunity to secure milk of such delicious and rich quality and perfect purity that the most fastidious will be able to use it with a feeling of security too often lacking in these days of hurry and indifference."

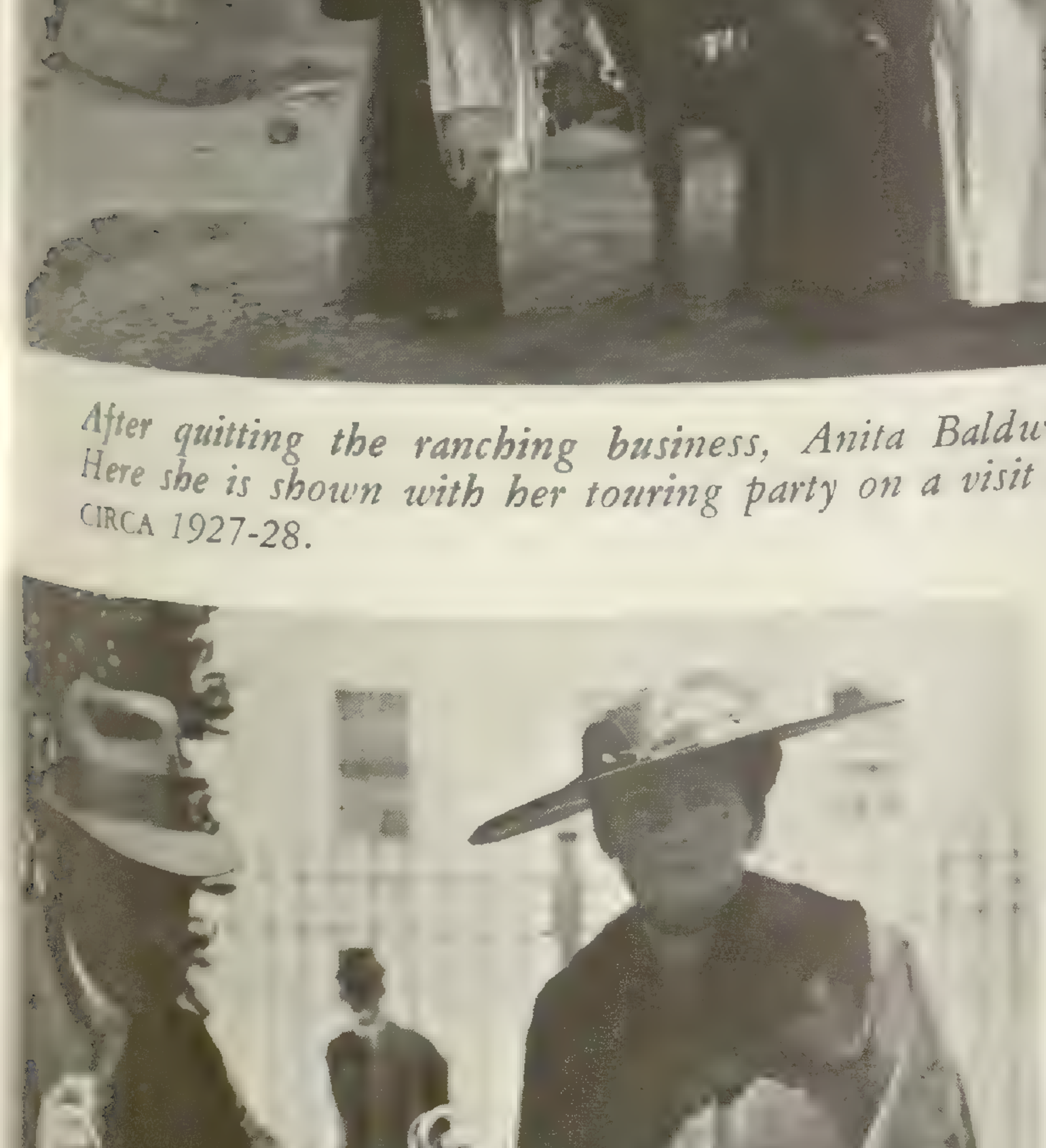
Anoakia was both a working livestock ranch and a breeding farm of unusual quality. Quoting from Anita's 1916 Private Catalogue of Rancho Santa Anita and Anoakia Breeding Farm, "It can be conservatively said that there is not another fertile spot on the Pacific Coast, nor in the great Southwest, more suitable or naturally adapted for the raising of purebred livestock than this portion of Los Angeles County . . . Shaded by five thousand or more beautiful oaks, centuries old . . . this region, generously endowed by nature, yields forth almost gratuitous service to every application of man's intellect. Here, where the elements and all the laws of nature are in harmony with human endeavor, the greatest developments are possible, and here it is that expert attention is devoted to raising Thoroughbred, Arabian and Percheron horses, Mammouth Jacks and Jennets, Holstein-Friesian cattle, Berkshire and Poland-China swine."

As shy and retiring as her father was vociferous and publicity-conscious, Anita emphasized that "The ranch is no longer a show place; we are conducting it on a purely business basis as a business proposition." As the years went on, however, the raising of purebred stock became more of an expensive hobby than a profitable enterprise, and by 1923 Anita decided to retire from the stock business. Except for certain of her pet horses and dogs, Anita, according to her livestock superintendent, Percy Bonebrake, gave all the thoroughbreds, Arabians, and crossbreeds to the Remount Division of the Army; some of the Percherons, jacks and jennets, cattle, and hogs she gave to agricultural colleges and boys' clubs; the remainder of the stock was quickly sold, and within a year liquidation was complete.

Through the late 1920's and early thirties Anita retained a tenuous hold on her lands in the Arcadia area. A Depression economy, though, more and more frequently put the need for cash above her emotional commitment to the land, and so she began to sell various parcels as home and business sites. In 1934, after engineering necessary changes in the zoning laws, she sold to the newly organized Los Angeles Turf Club 214 acres that within a year became the nucleus of the new Santa Anita Racetrack. Despite this and other piecemeal sales, however, Anita remained delinquent in payment of her city taxes, and on July 1, 1936 (just three years before her death), she sold the remaining 1300 acres of the Baldwin ranch (excepting only her 19-acre Anoakia homesite) to a real estate syndicate headed by Harry Chandler of the Los Angeles *Times*.

Included in the Chandler purchase was

After quitting the ranching business, Anita Baldwin traveled extensively abroad. Here she is shown with her touring party on a visit to the Great Pyramid in Egypt. CIRCA 1927-28.



Anita Baldwin with prize-winning English bulldog, one of many purebred animals she raised and owned.

all previously unsold land north from the Pacific Electric tracks near Huntington Drive to Colorado Boulevard and from the rear line of the Santa Anita Avenue properties west to Michillinda Avenue. Today's Los Angeles State and County Arboretum, including the historic lakeside houses, was an integral part of the purchase.

As Anita passed from the scene, so too did her reservations about opening the ranch to strangers. Through the late thirties and forties, Chandler's Rancho Santa Anita Corporation often rented the picturesque Baldwin lake and surroundings to motion picture companies brave enough to venture off the studio back lot. Tarzan swung through the jungle trees during this period; Humphrey Bogart strained to pull the *African Queen* through the marshy lake; and elephants, lions, and apes brought in to add a touch of realism frequently became *too* realistic. "I am told that Dorothy Lamour made a picture there some years ago," wrote Percy Bonebrake, "and her leading man was an ape, a chimpanzee . . . This picture was being made at the old ranch house, by the lake, and among the trees there . . . The picture was completed, and a few stills were taken, to be used on the advertising posters. One of them depicted Dorothy and the ape sitting side by side in two canvas chairs. He was posed very nonchalantly, his legs crossed and one arm thrown over the back of the actress' chair, and a few seconds later he bopped Dorothy a terrible blow on the neck and nearly killed her. This laid her up for weeks."

The motion picture business, though exciting, was only a sidelight for the new ranch owners. Organized as the Rancho Santa Anita Corporation, Chandler's real estate syndicate made plans to subdivide and sell the old ranch lands in several residential districts. Sales, in fact, were brisk and visitors many. One satisfied owner invited friends out both to view his new Arcadia lot and enjoy a picnic lunch at the lake. The friend, dermatologist and horticulturist Dr. Samuel Ayres, Jr., had recently been appointed to head a Horticultural Institute committee seeking possible locations for a southern California arboretum. "I'd never heard of Lucky Baldwin," wrote Dr. Ayres, "but we thought it would be a nice outing, so we accepted. We drove out there and when I saw it, I said to myself, 'This is it.' Up on Tallac Knoll there was a real estate tract office—street maps had already been drawn, stakes were placed, and they were about to put the lots in the knoll area up for sale. I told the tract manager, Wesley Davies, what I had in mind and he said he thought a few acres might be set aside for our project. I told him I wasn't talking about a few acres. I was talking about the whole thing!"

And the whole thing was what he got. Harry Chandler graciously took the property off the market while complex negotiations between the State, the County, and the Arboretum Committee took place. In January, 1947, the State of California and the County of Los Angeles jointly purchased from the Chandler syndicate 111 acres in the heart of the old rancho. The $320,000 sale price was well below what could have been realized on the open market, but at $2,882 an acre, it was still almost 15,000 times the twenty cents an acre Hugo Reid had received in the first Rancho Santa Anita sale (to Henry Dalton) one hundred years earlier.

Sandy Snider is an assistant in the historical section at the Arboretum.

An Arboretum is for people . . .

Most botanic gardens have a number of plant environments not normally found around the home. An exciting example may be found in the new Tropical Greenhouse at the Los Angeles State and County Arboretum. By means of controlled humidity, temperature, and light intensity, the environment created in this greenhouse is essentially the same as that found in equatorial latitudes, thus making it possible to grow such exotic plants as the vanilla vine and cocoa tree.

SCE

Southern California Edison Company

BOOKSHELF

THE FRAGRANT YEAR by Helen Van Pelt Wilson and Leonie Bell. 95 drawings; bibliography; index. Drawings by Leonie Bell. New York, Morrow. xiii, 306 p.
This is a softcover reissue of a book originally published in 1967. Based on the experience acquired in their gardens in Connecticut and Pennsylvania, the authors have written a guide to flowering plants of particular fragrance. After a review of scent classifications, they discuss the characteristics, care, and relative merit of a great number of plants according to the season in which they bloom. Roses and lilies each are awarded a whole chapter, as are the plants which are night-fragrant; herbs and indoor plants also receive their share of attention. Making their book even more comprehensive, the authors have included a checklist of fragrant plants which they have not yet tried. Although some of the plants are not suited to our climate or do not bloom at the time indicated in the text, this interestingly written and informative book should please the gardener who would appeal to the sense of smell as well as the sense of sight.

Joan De Fato

Recent acquisitions to LASCA Plant Science Library:

AQUATIC AND WETLAND PLANTS OF SOUTHWESTERN UNITED STATES, D. S. and H. B. Correll. Stanford Univ. Press, Stanford. 1975. 2v. Illustrations.
ARBOLES DE COSTA RICA, Vol. I, L. R. Holdridge and L. J. Poveda A. Centro Cientifico Tropical, San José. 546 p. Illustrations.
THE AVANT GARDENER; a handbook and sourcebook of all that's new and useful in gardening, T. and B. Powell. Houghton, Mifflin, Boston. 1975. 263 p. Illustrations.
THE COMPLETE BOOK OF HOUSEPLANTS UNDER LIGHTS, C. M. Fitch. Hawthorn, New York. 1975. 275 p. Illustrations.
THE COMPLETE HANDBOOK OF PRUNING, R. Grounds, ed. Macmillan, New York. 1975. 157 p. Black and white and color illustrations.
CYCADS OF SOUTH AFRICA, C. Giddy. Purnell, Cape Town. 1974. 122 p. Black and white and color illustrations.
EXPERIENCES WITH PLANTS FOR YOUNG CHILDREN, F. C. and C. W. Gale. Pacific Books, Palo Alto. 1975. 117 p. Illustrations.
FERN GROWERS MANUAL, B. J. Hoshizaki. Knopf, New York. 1975. 256 p. Black and white and color illustrations.
FUN WITH GROWING ODD AND CURIOUS HOUSE PLANTS, V. F. and G. A. Elbert. Crown, New York. 1975. 168 p. Black and white and color illustrations.
HERBS; a selected annotated bibliography, D. Schwartz, comp. New York Botanical Garden, The Bronx, N. Y. 1974. 16 p.
KNOW YOUR WOODS, A. Constantine, Jr. Rev. ed. Scribner, New York. 1975. 360 p. Illustrations.
LITTLE PLANTS FOR SMALL SPACES; how to select and grow mini plants and trees indoors and out, E. McDonald. Evans, New York. 1974. 192 p. Black and white and color illustrations.
MAKE YOUR GARDEN NEW AGAIN; how to landscape, replant and develop your property, S. Schuler. Simon and Schuster, New York. 1975. 255 p. Illustrations.
ORGANIC FLOWER GARDENING, C. O. Foster. Rodale Press, Emmaus, Pa. 1975. 305 p. Black and white and color illustrations.
ORNAMENTAL GRASSES, decorative plants for home and garden, M. H. Meyer. Scribner, New York. 1975. 136 p. Black and white and color illustrations.
PLANT AND PLANET, A. Huxley. Viking Press, New York. 1975. 432 p. Illustrations.
PLANT GROWTH AND DEVELOPMENT, A. C. Leopold and P. E. Kriedemann. 2d ed. McGraw-Hill, New York. 1975. 545 p. Illustrations.
THE POSTAGE STAMP GARDEN BOOK, D. Newcomb. Tarcher, Los Angeles. 1975. 150 p. Illustrations.
SANDER'S LIST OF ORCHID HYBRIDS, ADENDUM 1961-1970, Royal Horticultural Society. The Society, London. 632 p.
SEEDS OF WOODY PLANTS IN THE UNITED STATES, U. S. Forest Service. U. S. Dept. of Agriculture, Washington. 1974. 883 p. Illustrations.
WEED SCIENCE: principles and practice, G. C. Klingman and F. M. Ashton. Wiley-Interscience, New York. 1975. 431 p. Illustrations.

NOTE: A second printing of "Color For the Landscape" has just been issued. This attractive, hard-cover, 210-page volume will shortly be available in the Peacock Pavilion Gift Shop in the Arboretum.

LAGERSTROEMIA FAURIEI (Cover)

Lagerstroemia fauriei is a handsome small tree reaching a height of 25 to 30 feet. The tree has an interesting structure highlighted by a cinnamon-colored bark through the summer months. The bark patterns, pictured on the cover of this issue, result from a combination of exfoliating old bark and new-growing bark which together give the mottled effect that constitutes one of the most striking attributes of the plant.

This close relative of the common crape myrtle is indigenous to China. The leaves are small, ovate, entire, and are up to 2½-inches wide. They are stalked and usually alternate, glabrous or nearly glabrous. The flowers are white, rather small, and stalked in many-flowered terminal clusters but not nearly as showy as the more common **Lagerstroemia indica**. However, this tree has many attributes of its own. It does not sucker readily from its base, a maintenance problem with the common crape myrtle, and the treelike form is natural and diminutive, making the plant an excellent subject for parkway and small garden usage.

The plant seems to take most soil conditions from relatively heavy to well drained and will do well in most sunny locations with reasonable care. Excellent specimens may be seen on Tallac Knoll and in the entryway plantings. There has been no problem with diseases or insect pests. As a new Arboretum plant introduction for Southern California, plants and seed will be made available to the nursery trade.

ARBORETUM WEATHER

Lat. 34d 08' 48'' N.
Long. 118d 02' 59'' W.
Elev. 571.28 ft.

Weather season:
Oct. 1 to Sept. 30

	Feb.	Mar.	Apr.
Average daily maxiumum temperature	68.2	72.9	71.0
Average daily minimum temperature	44.6	44.0	46.0
Highest temperature	86	91	95
Lowest temperature	38	33	38
Number of clear days	13	15	12
Number of partly cloudy days	9	14	13
Number of cloudy days	6	2	5
Rain during this month	4.59	2.58	1.39
Total rain since Oct. 1st	5.63	8.21	9.60

Calendar

June, July, August, September

ARBORETUM, Arcadia

June 5, 6—Sat. 10 to 5 p.m.
Sun. 9 to 5 p.m.
Satsuki and Azalea Show*
Presented by Satsuki and Azalea Society

June 13—2 p.m.
Sunday Afternoon Talk*
"Decorative Plants from Dinner Leftovers"
Tak Niiya, chief, Education Division

June 20—10 a.m.
Sunday Morning Walk*
"Greenhouses"
Tim Lorman, horticulturist

June 26, 27—Sat. 12 to 5 p.m.
Sun. 9 to 5 p.m.
Gladiolus Show
Presented by S. Calif. Gladiolus Soc.

July 2, 3, 4—9 to 5 p.m.
Cactus Show
Presented by the Cactus and Succulent Society of America

July 25—10 a.m.
Sunday Morning Walk*
"Historical Buildings"
Sandy Snider, curatorial aid

August 14, 15—Sat. 12 to 5 p.m.
Sun. 9 to 5 p.m.
Begonia Show
Presented by the San Gabriel Valley American Begonia Society

September 12—10 a.m.
Sunday Morning Walk*
"Plants in the Home Environment"
Dr. David Deardorff, botanist

*Sponsored by Cal. Arboretum Foundation

DESCANSO, La Canada

June 6—2 p.m.
Annual Art Festival*

June 13—3 p.m.
"Excerpts from Show Boat"*
Glendale College Music Theater,
Milton Young, director

June 26, 27—3 p.m.
La Canada Players*
Works from Shakespeare
Robert Hackman, director

July 3, 4—3 p.m.
"Symphony of the Verdugos"*
Glendale Symphony Orchestra
Wesley Cease, conductor

July 10, 11—3 p.m.
Children's Plays presented by
La Canada Players*
Robert Hackman, director

September 12—10 a.m.
Sunday Morning Walk*
"Rose Garden and Annuals"
George Lewis, superintendent

SOUTH COAST BOTANIC GARDENS, Palos Verdes Peninsula

June 6—2 p.m.
Sunday Afternoon Talk*
"Indoor Container Gardening"
Edward Hartnagel, asst. superintendent

September 19—10 a.m.
Sunday Morning Walk*
"Fall Flowering Plants"
Jeffrey Hook, education assistant

September 26—2 p.m.
Sunday Afternoon Talk*
"Outdoor Container Gardening"
Edward Hartnagel, asst. superintendent

*Sponsored by South Coast Botanic Gardens Foundation

BIRDWALKS

ARBORETUM
1st Sunday of each month at 8 a.m.

DESCANSO
2nd and 4th Sunday of each month at 8 a.m.

SOUTH COAST
3rd Wednesday of each month at 8 a.m.

Lasca Leaves

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LOS ANGELES STATE & COUNTY ARBORETUM

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Editor
Donald S. Dimond

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department notes

SPRING EXTRAVAGANZA 1976

THE THIRD Spring Extravaganza was presented this year on May 22nd and 23rd in perfect weather. As always, this Arboretum event attracted thousands of home gardeners who came to see the exhibits, watch the demonstrations, hear the lectures and, in general, soak up, along with the sun, all the horticultural information offered during the two-day run. Pictured on this and the adjoining page are some of the things they saw.

California Arboretum Foundation volunteers signed up 125 new members.

Manning the plant clinic were, left, Charles Lee, staff horticultural consultant, and John Van Dam, turf expert, Farm Advisor office.

Many visitors were surprised to learn that the Garden for All Seasons is maintained by volunteers with no more gardening experience than they have.

Orchid, fern, and bromeliad fanciers enjoyed the new Tropical Greenhouse.

Fifteen varieties of ivy were displayed by the Southern California Ivy Society.

Mrs. John Grivich, building chairwoman, received check toward new Hall of Environmental Education construction from Mr. William Marcussen, vice-president for public affairs, Atlantic Richfield Company.

HALL OF ENVIRONMENTAL EDUCATION

MRS. JOHN A. GRIVICH, immediate past president of the California Arboretum Foundation and currently Building Fund Chairman of the Board of Trustees, has announced the receipt of a $10,000 grant from the Atlantic Richfield Company toward the construction of the Arboretum's Hall of Environmental Education. This generous donation joins those of Paramount Studio ($1,000), LuBelle Boice Young Trust ($1,000), Rockwell International Trust ($1,000), Metro-Goldwyn-Mayer ($500), and the California Arboretum Foundation members ($1,700). The Hall of Environmental Education is planned as a complex of 23,000 square feet that will include an auditorium-exhibit hall capable of seating 1,000 people, three 40-student classrooms, and a seminar room arranged around a spacious, covered patio. Present inadequate facilities consist of a 1948 pre-fab temporary administration building that is used for classrooms, and a 150-seat basement room for flower shows and special exhibits. The new structure will serve the increasing number of people who come to the Arboretum each year to attend classes, lectures, nature walks, field trips, flower shows, educational exhibits, special events, and meetings of garden clubs and horticultural societies. The California Arboretum Foundation has pledged to raise at least $500,000 toward the realization of this $1.4 million project, says Mrs. Grivich.

BOARD OF GOVERNORS

MR. F. HAROLD ROACH was unanimously elected president of the Department's Board of Governors last May 11, succeeding Mrs. Marilyn Stoke who will continue her membership in the 15-person appointive body. Mr. Roach has been a member of the Board since the Department was created in 1953 and had previously served two terms, 1970-1972, as its president. His association with the Arboretum goes back to 1945 when as a member of the Arboretum

Mr. F. Harold Roach

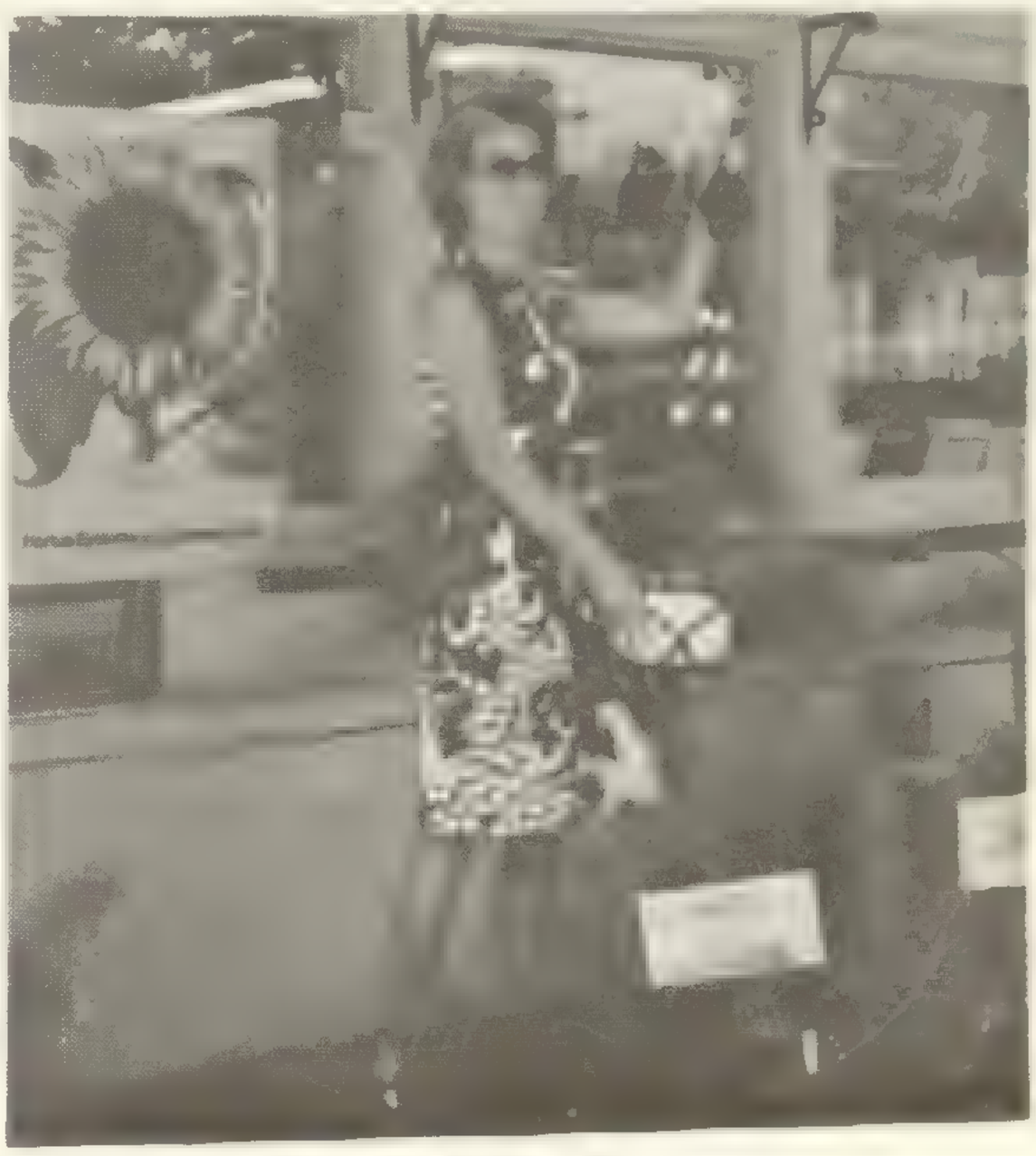
Committee of the Southern California Horticultural Institute he participated in the search for an Arboretum site. In 1955, he became a member of the California Arboretum Foundation Board of Trustees, serving as its president from 1963 to 1967.

A resident of Arcadia for the past 36 years, Mr. Roach is perhaps best known as the longtime publisher of the Arcadia Tribune and associated newspapers. During this period, 1940-1974, he also served for ten years as the director of the Los Angeles Newspaper Service Bureau and as a board member of the California Newspaper Association. Always active in civic affairs, Mr. Roach has served as the director of the Arcadia Chamber of Commerce, director and president of the Santa Anita Family Service, and continues to serve today as a trustee of the Methodist Hospital of Southern California and as a member of the United Way Budget Committee.

RUTH MARY LARSON

IN 1968, BEFORE the Arboretum's official service organization, Las Voluntaris, had been formed, a notice was placed in a "volunteer opportunities" column in the Los Angeles Times inviting women interested in becoming school field trip leaders to come to an orientation meeting to learn the nature and requirements of the job. Among those responding to the invitation was Mrs. Leland Larson, wife of a Hacienda Heights engineering contractor. No one recalls today how many new field leaders were enrolled at that meeting, but Mrs. Larson remembers it as the start of a new, extracurricular career for her, and Arboretum Director Francis Ching and the Arboretum staff look back to it as the happy beginning of one of the most effective volunteer contributions the garden has had the benefit of.

During her first three years, Ruth Mary served as a school field trip leader, adding, for the last two, service as vice-president of Las Voluntarias and chairmanship of the membership committee.



Ruth Mary Larson

In 1972, she was elected president of Las Voluntarias, occupying this position for two years while also serving as chairman of two Baldwin Bonanzas. In 1973, she was appointed to the County Board of Governors, and reappointed in July of 1975 by Supervisor Peter Schabarum. In 1974, she was elected first vice-president of the California Arboretum Foundation Board of Trustees and, two years later, was elected president, her present post. In the meantime, she took on the additional job of managing the Arboretum Gift Shop where she set about expanding the inventory, adding garden-related items and eliminating most of those in the souvenir category.

As president of the California Arboretum Foundation, Ruth Mary looks forward to doing all she can to further the growth and betterment of the Arboretum. "It is my fondest hope," she said, "that with the help of all our Foundation members we will be able to complete the drive for funds to build the Hall of Environmental Education within the next year or so."

Ruth Mary Larson is almost, but not

With Loran Whitelock, Arboretum trustee and cycad collector looking on, Department Director Francis Ching adds finishing touches to planting of a large Encephalartos *in Prehistoric and Jungle Garden.*

quite, a native daughter. Born in Rawlins, Wyoming, she has lived in this area since she was four years of age, growing up in Whittier where she raised her three children and where she attended Whittier College. Today she lives in nearby Chapman Woods, happy to be "on call" from the Arboretum for any of the special services she has willingly undertaken, such as baking a batch of brownies for a luncheon for which she will also serve as hostess, or filling in at the sales counter of the Gift Shop.

GIFT OF CYCADS

A LARGE CRATE containing cycads native to South Africa was received at the Los Angeles State and County Arboretum last May, a gift of the National Botanic Gardens of South Africa, Kirstenbosch. The plants were sent by the National Botanic Gardens as a contribution to the Arboretum's newest educational resource, the Prehistoric and Jungle Garden. Among the species received, all belonging to the genus *Encephalartos,* are: *horridus, humilis, lehmanii, friderici-guilielmi, trispinosus, arenarius, longifolius, altensteinii, latifrons,* and *natalensis.* Some of these species cannot be found or purchased in the United States. Together, they represent an important contribution to an Arboretum education program centered in a unique garden that offers students and visitors the opportunity to study plants that have survived in more or less unchanged form for two hundred million years. In addition to observing the living specimens, visitors will be able to observe plants that have evolved through a series of exhibits in the observation deck within the Prehistoric and Jungle Garden.

Because cycads are very slow-growing, it takes many months for them to return to their original growing condition after being moved from their natural habitat. It has been possible to plant three of the cycads received from the National Botanic Gardens in their permanent location in the Prehistoric and Jungle Garden; the remainder are reestablishing their root systems in containers before being planted in the ground.

CAF TRUSTEES

NEW MEMBERS of the Board of Trustees of the California Arboretum Foundation not reported in our last issue are Mr. Harris Newmark and Mr. David

L. Knutson. Mr. Newmark, a stockbroker, is drawn to the Arboretum through his family background. He is the grandson of Harris Newmark, onetime owner of Rancho Santa Anita and the author of the still highly-prized book, "Sixty Years in Southern California." It was the present Mr. Newmark's father and uncle, Marco and Maurice Newmark, who served as editors of the first edition of the book. Mr. Newmark's horticultural ties are through his mother's brother, Manfred Meyberg, the late president of Germain's Seed Company who is remembered for his many contributions to community beautification and whose wife made possible the construction of the waterfalls at the Arboretum. Mr. Knutson is president of Stover Seed Company, vice-president of the American Seed Association, and has been associated with the seed business practically since his graduation from the University of California, Berkeley, with a degree in agricultural economics. Mr. Knutson is married and has four children.

Following are brief profiles on new Board members whose elections we had previously reported.

Mrs. Thomas (Mitzi) Moore came to the Arboretum in 1972, and, like Ruth Mary Larson, through a volunteer-wanted notice in the Los Angeles Times. A history buff, her interest was in becoming a school field trip leader in the Department's historical section. After serving in this capacity for two years, she served two terms as president of Las Voluntarias. Mitzi, her husband, and their two young sons, are residents of Arcadia.

Mrs. Raymond (Wendy) Taylor joined the Foundation as a member of Las Voluntarias in 1973, also as a result of a notice in the *Times*. She worked for a time in the propagation greenhouse and in the herbarium and then served as a school field leader. She was the highly successful chairman of the 1975 Baldwin Bonanza. Wendy and her husband have a six-year-old son.

Mrs. John (Ellamae) Fehrer was first a member of the Board of Trustees from 1967 to 1973. She was state president of the California Garden Clubs, 1972-1974, and last year was appointed chairman of Arboreta and Botanical Gardens, a new national chairmanship of the National Council of State Garden Clubs. She is active in a number of local garden clubs having state or national affiliations.

Mr. Roy L. Kackley and his wife, Adeline, joined the Foundation las year. Mr. Kackley is a vice-president of the Parsons Corporation and project manager of the company's engineering activities in Algeria. Because of the nature of his work, he has gardened all over the world. His horticultural activities include the introduction of peanut growing to his friends in Iran. Mrs. Kackley is a volunteer in the Gift Shop.

Mrs. Varick (Diane) Martin has been a member of the Foundation since 1965. An avid gardener, she teaches vegetable gardening in the Arboretum's adult education program. Her ties to the Arboretum are further strengthened through her mother, Mrs. Elizabeth Stanton, who is an honorary trustee of the Foundation and who was one of the original Arboretun Councillors in 1950. Mrs. Martin and her husband live in Pasadena. They have a son and daughter.

Mrs. Dennis (Jane) Buck has been a member of the Foundation since 1972. Formerly a teacher in Los Angeles and South Pasadena schools, and currently a member of the American Association of University Women, Mrs. Buck serves as horticulture chairman for Las Voluntarias, and has been involved with floral arrangements for special Arboretum events, in particular the flower arrangements in the Sunset Demonstration Home Gardens. Mrs. Buck and her husband and son live in Arcadia.

Ben Suzuki, noted bonsai instructor, gave numerous demonstrations at the Fiesta sponsored by the South Coast Garden Guild.

FIESTA DE FLORES

THE 14TH ANNUAL Fiesta de Flores at South Coast Botanic Garden last May 15 and 16 was a particularly gala event since it coincided with the public opening of the new Administrative Center. Over 7,000 people came to enjoy the "Discovery Walk," the plant exhibits, the twice-a-day garden lectures in the new lecture hall, the plant sales, and the South Bay and Peninsula musicians and painters who added sound and color in the inner patio.

EUGENE D. HILLMAN

MR. EUGENE D. HILLMAN of Manhattan Beach was elected president of the Board of Trustees of the South Coast Botanic Garden Foundaiton at the organization's annual elections last June. A semi-retired lawyer, Mr. Hillman and his wife, Louise, are charter members of the Foundation and have been active in promoting the garden since its beginning in 1963. They have one daughter and two grandchildren.

The new president, chairman of the Foundation's Adult Education Committee since 1968, joined the Board of Trustees in 1972. He was one of three general coordinators for the past two Fiestas de Flores held each year at the garden. An active resident of the beach city, Mr. Hillman planned the landscaping for the Manhattan Beach Community Church of which he is a longtime member. A native Californian, he received his pre-legal degree from the University of Southern California and his law degree from Southwestern University, Los Angeles.

IRIS AWARD

BILL HAWKINSON, assistant superintendent at the Los Angeles State and County Arboretum and a longtime iris fancier, was presented with the C. G. White Memorial Award at the American Iris Society Annual Convention in Lansing, Michigan, last June. The award was for the best aril-bred iris of 1975, which Bill had named 'Grand Vizier'. The C. G. White Award is the highest honor given to the aril species of iris, equivalent to the Society's Award of Merit for conventional iris.

Although Bill's breeding work has been centered in the development of new aril-bred iris, he also breeds tall bearded, dwarf bearded, and other types of iris.

Among American Iris Society awards won by his aril-bred iris are at least five Honorable Mentions, numerous Exhibition Certificates, and one Queen of the Show. Outside the iris family, he is active in the breeding of daylilies *(Hemerocallis)* and has been successful in converting diploid *Hemerocallis* to tetraploids. Bill is a charter member, and currently vice-president, of the Aril Society International and a member of several iris societies.

QUEEN OF SHOW

A CAMELLIA hybrid, 'Lasca Beauty', developed during a genetic research project conducted at the Arboretum from 1962 to 1967, won the Charles Seidenglanz Award for the most outstanding flower in the Dallas Camellia Show held last May. The project had been cosponsored by the Southern California Camellia Research Advisory Committee and the Los Angeles State and County Arboretum. The work had begun under the leadership of Dr. Albert Longley and Dr. Clifford Parks, with Dr. Parks and a research team continuing the work from 1963 to the project's conclusion. Hundreds of camellias were crossed, three ultimately being selected for introduction. One was selected by the Los Angeles State and County Arboretum and named 'John Anson Ford' in honor of the former county supervisor who had played a major role in the creation of the County Department of Arboreta and Botanic Gardens. A color photograph of this camellia is on the cover of the June, 1971 issue of this magazine. Two others were selected by the Research Committee of the Northern California Camellia Society. One was named 'Dr. Clifford Parks' in honor of its developer. The other was 'Lasca Beauty', a pink, very large flower that is a cross between *C. reticulata* 'Cornellian', the seed parent, and *C. japonica* 'Mrs. D. W. Davis', the pollen parent. In 1973, scions of this cross were given to the nursery trade and 'Lasca Beauty', a winner, was launched.

TEAHOUSE ANNIVERSARY

ON SUNDAY, October 17, at 2:30 p.m., the Descanso Gardens Guild will be the host for a celebration marking the tenth anniversary of the dedication and gift of the Oriental Teahouse at Descanso Gardens to the County of Los Angeles. The program, planned by the Japanese-American community, will include a fashion show featuring Japanese ceremonial kimonos with Mme. Kan Sum as commentator, Western-style and picnic-style tea ceremonies with comment by Mme. Sosei Matsumoto, and an Ikebana demonstration. The cutting of the anniversary cake will conclude the program which will be held on the main lawn and will be open to the public.

The teahouse and adjoining Japanese Garden are the result of a long-term fund-raising effort started by Mrs. Judge Smith, a founder and first president of the Guild.

Co-chairmen for the event are Mrs. Meredith Wills and Mrs. Judge Smith, assisted by Messrs. Melvin Burt, Richard Smith, Samuel Ayres, Jr., James Hawkins, and Mrs. Nancy Dunn, president of the Guild. In charge of the program are Messrs. Katsuma Mukaeda, Masao Mitamura, Frank Kuwahara, and Kay Iizuka. Mr. Charles J. Detoy, former vice-president of the Guild board of trustees who was in charge of the original teahouse project, will again serve as master of ceremonies as he did at the dedication ten years ago.

Among the guests invited to attend the celebration are the members of the Los Angeles County Board of Supervisors, the Consul General and Mrs. Yukio Takamatsu of Japan, Miss Ayako Ito, vice consul of Japan, Director of the Department of Arboreta and Botanic Gardens, Mr. Francis Ching and Mrs. Ching, former Arboreta and Botanic Gardens director, Dr. William Stewart and Mrs. Stewart.

LOS ANGELES BEAUTIFUL AWARDS

NINE TROPHIES, 13 certificates of commendation, six youth certificates of commendation, and nine letters of commendation were presented to Southern California civic and beautification groups by Los Angeles Beautiful, Incorporated, at its awards program and picnic at Descanso Gardens last June 30.

Los Angeles Beautiful is the nonprofit volunteer organization founded in 1949 when Mrs. Valley M. Knudsen was asked by the Los Angeles Chamber of Commerce to create a committee made up of community leaders that would respond to the growing concern over an increasingly dilapidated Central City area. Trees, shrubs, and flowers were being replaced by asphalt and concrete as the metropolis of Los Angeles expanded. The committee, known as Los Angeles Beautiful, grew and flourished as it responded to the problem.

Over the years, Los Angeles Beautiful has won the highest award presented by Keep America Beautiful for the "most outstanding organization of its kind in America" and has received recognition from former President Dwight D. Eisenhower, a citation from former President and Mrs. Lyndon B. Johnson, and the Governor's Trophy at former Governor Ronald Reagan's Bicentennial celebration. The March 1962 issue of Reader's Digest carried the story of Los Angeles Beautiful ("Civic Beauty is Good Business"), which inspired many others to join the crusade.

Trophy winners and their categories at the Los Angeles Beautiful awards program at Descanso Gardens were: Inglewood Women's Beautification Association for Best Use of Color; Natural Beauty Program of San Bernardino for Outstanding Effort on Behalf of Environmental Quality; Seal Beach "Heritage Park" for Consistent Quality in Use of Plant Materials; Brengle Terrace Park, Vista, for Outstanding Community Effort; "Spirit of '76 Park," City of Paramount, for Most Innovative Design; California Conservation Project for Outstanding Youth In Education Achievement; Storm Centers—Los Angeles for Outstanding Plant Project by Youth; and South Gate Chamber of Commerce Beautification Committee for Outstanding Achievement in Promoting Community Awareness of Environmental Quality.

A special trophy award was presented to Mr. Ruben Juaregui, president of the board of directors of Plaza de la Raza, in recognition of extensive restoration of buildings at Lincoln Park—in particular the Lincoln Park boathouse—and for the development of new cultural facilities there. Mrs. Eddie (Margo) Albert, a member of the Plaza de la Raza board, expressed her appreciation for the award and spoke of the value of the Plaza as an interracial community project promoting understanding and good will.

SECOND PRINTING

A SECOND printing has been announced of "Color for the Landscape," the one-of-its-kind 210-page book published under the auspices of Los Angeles Beautiful, the California Arboretum Foundation, the Southern California Horticultural Institute, Descanso Gardens Guild, the South Coast Botanic Garden Foundation, and the Theodore Payne Foundation for Wild Flowers and Native Plants. In a text edited by Dr. Mildred Mathias, and in 204 color photographs taken by the late Ralph D. Cornell, the landscape architect to whom the book is dedicated, "Color for the Landscape" describes and provides horticultural guidelines for hundreds of flowering trees, shrubs, vines, ground covers, and native plants suitable to southern California. The book is available in the Arboretum Gift Shop.

Plant Collecting

Loran Whitelock

WE TOILED our way down the mountainside. It was a steep and treacherous landscape made up of jagged limestone and mats of rotting leaves. We had to be careful to step only on the rock outcrops as the soft beds of leaves often covered deep crevasses which formed traps for the unwary. Even the rocks were sometimes loose, presenting the danger of tripping or sliding into the canyon below. We had to be very cautious because we carried cycad trunks weighing approximately 100 pounds each. Even the weather worked against us. The temperature was over 90°F. and the humidity near 80 percent. Sweat blinded us, mosquitoes and ticks fed on us, and it seemed as if every plant had spines or thorns to tear at our clothes and flesh. Such are the joys of plant collecting!

The uninitiated think of plant collecting in foreign countries as a romantic and exciting adventure. It can at times be exciting and often an adventure, but it is very seldom romantic. Plant collecting is hard work. The day starts at 3:30 or 4 a.m. when the alarm goes off. The first order of business is to boil water for coffee, get dressed, and put cameras, binoculars and other equipment back into the car. After a couple of cups of coffee and filling the thermos we're off. The area to be worked will usually be a two- to four-hour drive away. When it is reached, the footwork begins. Scanning the hills with binoculars and questioning

Arrows trace route taken by author on planting-collecting trip to Mexico.

Dioon sp. *and Ed Carlson near Rio Verde, San Luis Potosi, Mexico.*

Mature female cone of Dioon sp. *found near Jacala, Hidalgo, Mexico.*

the Indians are the usual ways of locating the desired plants. If the plants are located, which can sometimes take hours or days, then the real work begins. They must be dug, labeled, and transported back to the car, hard work since the car is parked sometimes miles away. The collecting usually lasts until dark at which time the long drive back to camp starts. Finally back, the car must be unloaded and the plants properly protected. Then a shower, dinner, pressing the herbarium material, writing up collection notes, and planning the next day's search. Thus ends the typical 16- to 18-hour collecting day!

Early last year I had agreed to collect plants in Mexico for the Arboretum's new Tropical Greenhouse and its Prehistoric and Jungle Garden. At the same time I would be collecting data on some of the Mexican cycads and herbarium specimens. The departure time was set for late November. Ed Carlson, a friend and plantsman, was to accompany me to share in the work, and hopefully some of the discoveries.

It had been decided that the states of Vera Cruz, Oaxaca, and Puebla would be the target areas, with some incidental collecting on the east coast on the way south. Information was collected and studied along with detailed maps of the areas to be worked. The collection of cycads was to take precedence over other plants since they would be the most difficult to locate and collect. Our base of operations was to be at Fortín de las Flores, Vera Cruz, a distance of about 2,400 miles from Los Angeles. The duration of the trip was to be two to three weeks. To keep our families happy, we were to leave right after Thanksgiving and return just before Christmas.

Considerable time was spent deciding just what equipment would be needed and then getting it all on a checklist so that nothing would be forgotten. Such things as extendible collecting poles, bags, notebooks, cameras, labels, insecticide, insect repellant, digging implements, water, tools and a multitude of other items

found their way onto the list. We could not afford the time to search for overlooked necessities once we were on our way. Our vehicle was a one-ton Chevrolet van with heavy duty tires, shocks and springs and a 36-gallon gas tank. More than once we were to bless the capacity of the gas tank! Our plan was to enter Mexico at Laredo, Texas, follow the Pan American Highway south to Mexico City, then east to Fortín de las Flores, Vera Cruz. From here we would fan out to various collecting areas. Our return trip would be via Mexico City, Guadalajara and up the west coast of Mexico. Our point of entry into the United States would be at San Ysidro, California.

We left at 9:15 a.m. on Friday, November 28, 1975. The rain was beginning to fall over Los Angeles. We drove for 31 hours straight through to Laredo. During this part of the trip the storm front stayed with us. We drove through snow, rain, hail, wind and sand storms the entire way. We had a well-earned rest at Laredo Saturday night and entered Mexico at 4 a.m. Sunday morning.

Clearance through customs and immigration took about an hour. By noon we had located our first colony of cycads near Lineres, Nuevo Leon. We spent the afternoon collecting and photographing these plants. It was a fine way to start our first day in Mexico.

In thinking back over this trip, it would seem that most days were memorable in one way or another. Our second day in Mexico started at 3 a.m.! We headed towards Rio Verde, San Luis Potosí, and the rumor of cycads. We arrived at the area well in advance of daylight and slept in the truck till sunrise. We located our cycads without too much trouble. The problem was in removing them. They were growing in almost solid limestone. It took hours of bone-jarring work to dig them out with a crowbar, and more hours to cut a trail through the thornbush so that they could be carried back to the van. At last we were finished and headed towards Jacala, Hidalgo. A three-hour drive up a narrow mountain road brought us to Jacala, a small town nestled in the Sierra Madre Oriental. We found a hotel, obtained a room, a hot meal, and a cold shower. I knew that there was a cycad in the mountains near Jacala and was determined to find it. After a lot of questioning of some of the locals, I found a man who knew the plant and made arrangements to meet him the next morning.

The morning was frosty, but we had a 12-mile hike to keep us warm. Unlike the Rio Verde plants, these were very easy to dig. Ed and I explored and photographed while our guide and helper dug plants and loaded the burro. We lunched on tortillas and beans warmed over a campfire then started our long climb back up the mountain, this time all uphill and loaded down with plants and seed. My backpack weighed 80 to 90 pounds, and at first I had doubts of ever making it back. Our guide carried the largest plant which must have weighed about 130 pounds! Bed felt very good that night.

The next day found us in Vera Cruz after a hectic drive through Mexico City. The beautiful snowcapped peak of Mt. Orizaba towered above us at an altitude of almost 19,000 feet. Here, the mountain area is an intense green and contains some of Mexico's largest coffee plantations.

Our base camp was the Posada Loma, a collection of cottages set in the midst of a private botanic garden. Here we had beautiful surroundings, hot water, and good food in abundance. Senora Blanca Alvarez is the proprietress of this establishment. She has a wealth of knowledge of the plants in her area and Mexico in

The author with a large specimen of Dioon spinulosum *found in the jungle near Tuxtepac, Vera Cruz, Mexico.*

general. No trip into the State of Vera Cruz can be complete without at least a short stay at the Posada Loma.

We took many side trips in all directions from the posada. To the north, near Huctusco and Xalapa, is an area famous for its many plant varieties. Here the trees are loaded down with tillandsias, ferns, orchids, and a multitude of epiphytic plants. There are enough cycads, palms, begonias, and other forms of plant life to gladden the heart of any plant collector or tourist. Another day we headed west to the coast and then south along the Gulf of Mexico past thousands of palms, scenic sand dunes, and then into the cool green forests surrounding Santigo Tuxtla, Vera Cruz. Inland we entered an area of hot, steaming jungles covering the low limestone hills. Huge trees towered almost 100 feet above our heads, their branches supporting a tangle of vines and philodendrons. So little light penetrated this continous canopy of leaves that it was impossible to take photographs without the aid of a flash gun. Here the silence was almost complete, broken only by the calls of parrots and monkeys. The air is hot and oppressive in the shade and almost unbearable in the sun. Growing within this dense cover of trees and vines we find dozens of shade-living plants. Many species of the dwarf *Chamaedorea* palms grow here along with anthuriums, ferns, begonias, and the strange *Dioscoreas* with their long vines emerging from a tuber resembling the shell of a tortoise. We also find majestic towering trunks of the cycad *Dioon spinulosum,* some of them reaching 50 feet in height!

Another day we travel to Tehuacan in the State of Puebla. The stark countryside in this area is reminiscent of southern Arizona. It is a hot, dry desert with huge cactus and succulents predominating. High, rocky mountains contain many more interesting plant forms that are

Very large old specimen of Dioon sp. *found near Jacala, Hidalgo, Mexico.*

Mt. Orizaba, altitude 18,851 feet, can be seen from many parts of central Vera Cruz.

equipped to survive in the almost total absence of rainfall for most of the year. Again, we discover cycads growing on the steep mountainsides.

Finally we have completed our collecting and will now spend two or three days preparing the plants for the long trip back to Los Angeles. They must be cleaned, dipped in insecticide, labeled, packed in boxes, and finally packed into the van.

On our return trip, there was one bit of excitement I will not soon forget. We had been driving all night, and Ed had taken over the wheel so I could get some sleep. I was just dozing off when Ed stopped the van and asked me to tell him which road to take. By the time we got underway again, I was wide awake. About twenty minutes later he pulled the van off the road again and called to me. This time I pretended to be asleep and let him work it out for himself. He called to me again and said there were a lot of soldiers running after us with guns pointed at the truck. At this point, I was wide awake! Looking out the back window I found he wasn't joking. There were eight soldiers with rifles and machine guns and one man in civilian clothes with a .45 automatic. They were about twenty yards behind us and running as fast as they could. There was also a police car with red lights flashing just turning into the road behind us. I asked Ed what he had done to cause all of this action. He said, "Well, there was a checkpoint back there and I guess I should have stopped." By this time they had reached the truck and were looking very unfriendly. I got out and asked the plain-clothes man what the problem was. He said that this was a roadblock to check for narcotics and why hadn't we stopped? Using my best Spanish, I explained that my friend did not understand that he was supposed to stop but thought it was a check station for cargo trucks. He seemd a little friendlier at this point and asked to see our papers. When he had checked the car permit and visas, he asked if we had any marijuana in the truck. I said no, we had many kinds of plants but no marijuana. I produced our plant collecting permit and explained that we were collecting for the botanic gardens in Los Angeles. We finally parted on friendly terms with a warning to stop at all road-blocks as "one could get shot if one did not." I thanked him and we continued on our way. This was the first of five narcotics roadblocks we were to encounter. Needless to say, we did not run through the other four.

The remainder of the journey back was more or less uneventful. We drove nonstop to the border, over 2,400 miles. Among the many hundreds of plants were four species of *Dioon,* five species of *Ceratozamia,* one species of *Zamia,* 14 species of *Tillandsia,* three species of *Begonia,* one species of *Dioscorea,* one species of *Selaginella,* two species of *Rhipsalis,* five species of cactus and several species of *Chamaedorea.*

The plants are safely in the Arboretum's collection. Their growth did not seem to even slow down with the change of location and climate. In fact, some of them are already growing better here than they were in their natural habitat.

Now it is difficult to recall all the hard work and problems of the trip. Only the good times cross one's mind, and it seems it was a pleasant trip indeed!

Loran Whitelock, a member of the California Arboretum Foundation Board of Trustees, is a worldwide collector of cycads and the owner of the largest known private cycad collection. Mr. Whitelock serves as an advisor for the Arboretum's Prehistoric and Jungle Garden.

PLANT PORTRAITS

David Deardorff

Montezuma Cypress

THE MONTEZUMA CYPRESS, like its relatives the California redwoods, is noted for its longevity, size, evolutionary age, and rugged beauty. The Aztecs called it "Ahuehuete," "the old-man-of-the-water," or "ancient one." One specimen, the "Arbol de Montezuma," is now at least 700 years old. It was only about a century old when the Aztecs (or Mexicas), a wandering tribe, arrived in the Valley of Mexico and began to build the fabled city of Tenochititlán. Two hundred years later, Tenochtitlán was a great city, the religious and economic hub of the Aztec Empire.. That it was also an advanced center of gardening is reflected in the writings of the early Spanish conquerors and colonials. Their enthusiastic reports, in fact, may have influenced the development of botainc gardens in Europe. When Cortés wrote home to Carlos V about an earlier Montezuma's tropical garden, he said it was "the finest, pleasantest, and largest that ever was seen, having a circumference of two

leagues." The poet king, Nezahualcoyotl, born in 1403, inherited and developed a number of gardens. At one palace there was a double row of gigantic ahuehuetes arranged in a square facing the points of the compass. A 1565 description of Montezuma's gardens says, "This great monarch had many pleasaunces and spacious gardens with paths and channels for irrigation. These gardens contained only medicinal and aromatic herbs, flowers, native roses and trees with fragrant blossoms, of which there are many kinds." During his captivity, Montezuma was allowed by Cortés to visit those of his gardens that were within two leagues of the city. Aqueducts brought water from the springs on the granite crag they called Chapultepec on which a temple, the Emperor Montezuma's summer home, was built. A grove of about 200 trees of the Montezuma cypress, *Taxodium mucronatum,* grew at the base of Chapultepec, and the Tree of Montezuma, about three hundred years old by then, was one of the largest. Today it is a magnificent tree 170 feet tall, and the grove in which it stands is protected in Chapultepec Park, Mexico City.

Another famous tree is the "Arbol de la Noche Triste," "Tree of the Sad Night," at Popotla. Cortés made his camp beneath this tree on the night of July 2, 1520, after the people of Tenochtitlán had revolted, killed their own Emperor and, in the ensuing battle, had driven Cortés and his men from the city. It was Cortés worst defeat and that night must indeed have been a long and sad one. Both the Tree of the Sad Night and the Tree of Montezuma are still alive and are living historical reminders of the conquest.

The most famous specimen of *Taxodium mucronatum,* however, is "El Gigante" near Santa María del Tule in Oaxaca. This tree is one of the largest living things on earth, not because of its height (a mere 140 feet) but because of its trunk, a massive, convoluted, living wall of wood about 50-feet across at its widest point. Humboldt is supposed to have visited this tree and to have attached a plate, since grown over, to the trunk giving the tree's dimensions. The most reliable estimate of the tree's age is 1,500 to 2,000 years, which means this particular tree has been living and growing while a succession of brilliant civilizations of man have risen and fallen around it. It has sheltered Toltecs, Aztecs, Zapotecs, and Spaniards (including Cortés) beneath its branches and, four centuries after the conquest, still survives in the modern nation of Mexico. *Taxodium mucronatum* has, fittingly, been proposed as the national tree of Mexico.

T. mucronatum has served many useful functions for man. It was a major source of timber for the construction of both Tenochtitlán and Mexico City. Due to continuing demands for timber and charcoal, the natural groves have been decimated. Many of the large old surviving specimens and groves are in or near Aztec ruins. *T. mucronatum* was an important medicinal plant and was probably regarded as sacred. When wounded, the tree produces a gummy resin which the Aztecs used to cure skin diseases and toothaches. Burning chips of the wood in a reducing atmosphere (covered with earth) produced a pitchy substance regarded as a cure for bronchitis. The leaves were used as a relaxant and a cure for itching; the bark was used as a diuretic and an emmenagogue.

Because it often retains some foliage through the winter, *T. mucronatum* is usually described as an evergreen tree even though it normally sheds all its leaves when new growth emerges in the spring. It may shed some or all of its leaves in the fall, however, becoming

nearly leafless through the winter like its close relative *T. distichum,* the bald cypress of the swamps and bayous of the Deep South. The specimens of both species on the grounds of the Los Angeles State and County Arboretum are usually deciduous. The two species differ primarily in the morphology of their reproductive structures. *T. mucronatum* has a needlelike point (a mucro) on the megasporophylls (the scales of the seed cones), and *T. distichum* has relatively smooth megasporophylls.

The Montezuma cypress and the bald cypress, the only two surviving species of the genus *Taxodium,* are members of an evolutionary ancient family, the Taxodiaceae. Representatives of this family first appeared in the fossil record in the Jurassic Period of geologic history, some 135-180 million years ago. The genus *Taxodium* appeared at the beginning of the Tertiary Period, some 63 million years ago. *Taxodium* and its relatives (including *Sequoia, Sequoiadendron, Metasequoia,* and *Glyptostrobus*) were numerous and widespread during the Miocene epoch, and were distributed through practically all of North America, Asia, and Europe until the Pleistocene epoch, the so called ice-ages, began one to three million years ago. Today there are only eight surviving genera in the family. All are relics, restricted by climatic change to particular habitats in specific geographic regions. All of these genera are prized for their beauty and are grown as ornamental plants.

Recently, a merger has been proposed between two families of conifers, the Taxodiaceae and Cupressaceae, a proposal (Eckenwalder, J. E. 1976. Madroño 23: 237-256) which will probably become widely adopted under the latter name.

Like other large trees, such as *Cedrus deodara* or *Sequoia sempervirens, Taxodium mucronatum* has many desirable features as an ornamental plant in spite of its size. Although the crown is broad and spreading, with strong horizontal main branches, it has delicate, weeping branchlets. The graceful sprays of pendulous branchlets bear flat, needle-like leaves and the canopy is open and airy, casting light shade. The Montezuma cypress provides an extremely fine, lacy texture as a background planting or as a specimen tree in large lawns. Under cultivation in the garden, *Taxodium mucronatum* usually only reaches 75 feet tall. It is fast-growing, averaging 40 feet in the first 14 years, and is one of the few conifers that will tolerate a lawn watering schedule. It is drought tolerant when established, but drought slows the growth rate considerably. Colonies of this species have been discovered growing along seasonally dry stream courses in the lower Sonoran desert of Sonora, Mexico. The tree is hardy as far north as Puget Sound, and has no pests or diseases.

Representatives of six of the eight living genera of the Taxodiaceae are grown at the Los Angeles State and County Arboretum; several species can be seen in the new Prehistoric and Jungle Garden near the lagoon. The largest specimen of Montezuma Cypress on the Arboretum grounds is one along the path from the Coach Barn to the Queen Anne Cottage in section N-8 of the historical area. This tree was planted more than twenty-five years ago and is now 73 feet tall with a trunk diameter of three feet. It is an excellent example of the ornamental potential of this species.

Aside from its romantic history, incredible size and longevity in the wild, and its ancient evolutionary origin, the Montezuma cypress is a beautiful and desirable ornamental tree.

Dr. Deardorff is a member of the department research staff involved in taxonomic studies.

A PLANT FOR A CONTAINED ATMOSPHERE

John Provine

TWO INTERESTING plants that can be grown in a contained atmosphere are *Selaginella kraussiana* and *S. kraussiana* 'Brownii', both members of the Selaginellaceae family, which consists of over five hundred widely distributed species, most of them tropical.

S. kraussiana and its cultivar, Brownii, are the most commonly grown in a contained atmosphere. *S. kraussiana,* named in honor of a 19th century German zoologist, C. F. Krauss, is native to South Africa and the Azores. In its native habitat, it is found growing in humid areas trailing over rocks and land in shady areas. This species is moss-like, forming a thick mat but never very dense. It has fragile stolons with scattered rootlets.

The following steps should be followed in growing *S. kraussiana* cv. Brownii in a contained atmosphere:

1. Select a clear glass or plastic bowl; the one pictured is a five-inch bowl.
2. Clean the bowl thoroughly with detergent and rinse with bottled water.
3. Cover the bottom of the container with chips of charcoal to allow for drainage.
4. Add moist growing mix. The Arboretum prefers a soilless mix of one half peat moss and one half perlite. This is a light growing mix and will allow for correct moisture and oxygen balance.
5. Plant selaginella in the growing mix making sure you pack the mix around the roots firmly. If roots are not firmly packed, you may have dieback of the plant.
6. Water the plant with distilled water. A cooking baster should be used by pointing the open end against the glass so that water will run down the inside of the container, thereby preventing splashing the soil on the sides of the container. Let the water stand so that the growing mix can soak up the water, then tilt the container slightly and take the baster and pull off the excess water.
7. Cover your container with a lid or saran-type wrap.
8. Selecting a place in the home or office is one of the most important steps. Selanginellas are somewhat sensitive to the sun. If they get direct sun they will turn brown and decline.

On hot days, as the temperature of the home or office gets warmer, the temperature inside the bowl will likewise get warmer. To correct this, pull back the lid to allow the temperature to adjust. This is the same as opening a greenhouse vent.

S. kraussiana and its cultivar, Brownii, are easily started from division of the plant or other vegetative propagative process. Plants of 'Brownii' are available at the Arboretum Gift Shop, although the supply is limited. Kraussiana are available at the annual Baldwin Bonanza.

This is another in a series of articles on plants for a contained atmosphere by Mr. Provine who is superintendent of the Los Angeles State and County Arboretum and a specialist in this type of planting.

Selaginella kraussiana *cv. Brownii in a five-inch bowl.*

A Visit to the Arboretum Herb Garden

Caroline Hoover

A VISIT TO THE Herb Garden at the Arboretum seems particularly appropriate during this Bicentennial year since it affords visitors a view of a kind of garden popular 200 years ago. American colonists grew the same kinds of plants we grow in our herb gardens today but used them for different purposes. For example, they used herbs not just for flavoring their foods but, more important to them, to disguise the taste of half-spoiled meat. Every householder of the period grew, side by side with his vegetables, the sweet and medicinal herbs he called "simples," or "physic herbs," to provide "savor, sustenance, and physic." ("Simples" referring to a simple therapeutic remedy for a simple illness.)

The earliest botanical gardens were essentially medicinal and culinary gardens. These were the monastery gardens of the middle ages. Here, the pioneers, as they moved westward, had no time for such "nonessentials." fresh game was plentiful and so there was no need for culinary herbs. From Indians, or by experiment, they learned how to make simple remedies from usable wild plants as they found them. Also, there were always medicine men available offering a variety of cure-alls. So the cultivation of herb gardens in the West all but disappeared until recent years.

The Herb Garden at the Arboretum is one that people can enjoy throughout the year. Designed in 1953 by Edward Huntsman-Trout, landscape architect, it was laid out in 1955 by members of the Herb Society of America, Southern California Unit, and members of the Arbore-

tum staff. Through the efforts of members of the Society and the Arboretum staff, the collection now contains about 500 plants and includes annuals, biennials, perennials and deciduous and evergreen trees like the willow, flowering plum and apricot, a crab apple tree, a sassafras, a pinon pine, a California bay tree, a rose or two, a lilac and irises, even edible chrysanthemums in the culinary bed. Colorful clove pinks and daylilies line the main walkway which borders the Shakespeare Garden. Most English and American herb gardens include a section containing as many as possible of the herbs Shakespeare refers to in his plays. He is known to have made frequent visits to the garden of John Gerard, the best known English herbalist of the period, and so we can assume that his herbal references resulted, at least in part, from those visits. Our own Shakespeare Garden contains a good representation of the herbs Shakespeare mentions in his literary works.

(continued on page 86)

Oriental garlic and golden thyme line the pathway to the sun dial located near the center of the Herb Garden.

The cone-shaped hedges are sweet bay surrounded by germander and common thyme.

The center of the children's Fairy Ring is Scotch moss; the border is made up of lamb's ears, roses, mint, and santalina.

An Arboretum is for people . . .

A question asked today of almost any kind of new construction, big or small, is: What will be its environmental impact? A highly satisfactory answer to this question has been achieved for some new developments at Descanso Gardens in La Canada. Pictured above is one of five new demonstration patios — set amidst green lawns, ancient oaks, and prized camellias — that serve the multiple purpose of providing an unobtrusive setting for flower exhibits, an education in patio construction, and a restful stopover for visitors.

SCE

Southern California Edison Company

The sun dial with its intertwined hedges of English thyme, germander and santalina, and clipped sweet bay trees *(Laurus nobilis)* is set in a formal design. Adjoining the path with its inviting benches and neat hedge of dwarf myrtle is the long medicinal garden and the fragrant section, which has a lovely bird bath in its midst. Among medicinal plants used three centuries and more ago and still in use, are horehound for coughs, foxglove as a source of digitalis and, to some extent, rue and wormwood. We commonly think of lavender and its many varieties when we speak of a fragrant garden, but of course most herbs have fragrant leaves, some requiring gentle rubbing to release their bouquet. The garden's tea bed brings to mind the Liberty Tea drunk at the time of our American Revolution. A number of teas were called Liberty Tea; a popular brew and a favorite of the Oswego Indians was Oswego Tea made from a wild horsemint, *Monarda didyma.* This and other "liberty teas" were drunk as a patriotic gesture at the time of the Boston Tea Party.

Our culinary garden contains such plants as angelica for candying, basil for use with tomatoes, oregano for pizza, parsley for salads, sage for dressings, tarragon for vinegar, and rosemary for lamb. Our dye bed contains red dyes like madder *(Rubia tinctorum)* and safflower *(Carthamus tinctorius),* yellow dyes like dyer's broom *(Genista tinctoria),* goldenrod *(Solidago odora),* and sassafras *(Sassafras albidum),* and blue dyes like wild indigo *(Baptisia tinctoria)* and woad *(Isatis tinctoria).* These are all important dyes known at least for two centuries. Madder was a staple red color for wool, silk, and cotton by the 18th century. Apart from these sometimes difficult-to-obtain plants, dyes can be made from such common plants as strawberry root, avocado and eucalyptus leaves, and various species of sagebrush.

Other areas which make up the whole of the three-and-a-half-acre garden are the thyme, lavender, and rosemary collections, and the Braille Terrace. Developed in 1969, the Braille Terrace is a touch-and-see collection of fragrant textured herbs set close to a winding, waist-high 75-foot wall that serves as a guide for sightless visitors. Plant names are printed in braille and visitors are encouraged to rub the leaves of the different plants so as to enjoy their texture and fragrance. At the end of the Braille Terrace is the Fairy Ring, a small garden for sightless youngsters under the age of six containing miniature roses, mosses, and other low-growing textured plants. Replacing the native garden, which is being moved over by the Hugo Reid Adobe, will be a colorful flowering herb bed for all who ride the tram to see.

All of this responsibility is shared by the Arboretum and the Herb Society members. The Society purchases plants and materials for the growth and maintenance of the garden. Funds are raised for these purchases through an herb sale each fall following harvesting by members. Arboretum gardener Jack Toyota maintains the garden while members of the Southern California Unit work in the garden in the morning on the first and third Thursday of each month. In these periods beginners can contribute hours of productive work while gaining practical information about the cultivation of herbs. Extra volunteers are always welcome in this garden which is the result of much cooperative effort. Do be sure to pay a visit there soon.

Caroline Hoover is a director of the Herb Society of America and a member of the Southern California Unit.

CALLISTEMON 'RED CASCADE' (Cover)

Callistemon 'Red Cascade' is the most recent Arboretum introduction. It is a small tree that may reach 20 feet in height in time. The leaves are elliptic, pointed, and rigid. They have a short petiole and are alternate. This Arboretum selection is distinguished by having larger flowers and clusters than the species and a much more pendulous habit than is usually found among the cultivars currently available.

Like most of the bottlebrush group, the numerous stamens are the conspicuous flower-like structure. The flowers are red, in dense clusters which begin terminally, but as growth develops they are located further down the stem. The woody fruits remain on the stems for several years.

The original selection may be seen in the Australian Section of the Arboretum.

Ideal growing conditions would be an open sunny location with light, well-drained soil. Moderate watering and fertilizing are adequate.

With the need to get more color into the landscape and to satisfy the demand for small plants for the small gardens of today, **Callistemon** 'Red Cascade' should become one of the more popular Department introductions.

ARBORETUM WEATHER

Lat. 34d 08' 48" N.
Long. 118d 02' 59" W.
Elev. 571.28 ft.

Weather season:
Oct. 1 to Sept. 30

	May	June	July
Average daily maximum temperature	79.9	90.3	90.4
Average daily minimum temperature	54.3	57.6	62.4
Highest temperature	101	111	103
Lowest temperature	50	50	57
Number of clear days	6	20	13
Number of partly cloudy days	22	8	17
Number of cloudy days	3	2	1
Rain during this month	.16	.12	T
Total rain since Oct. 1st.	9.76	9.88	9.88

Calendar

September, October, November, December

ARBORETUM, Arcadia

September 12—10 a.m.
Sunday Morning Walk*
"Australian Section"
Dr. Gary Wallace, botanist
September 26—2 p.m.
Sunday Afternoon Talk*
"Plants in the Home Environment"
Dr. David Deardorff, botanist
October 9, 10—10 to 5 p.m.
Bonsai Show
Presented by the Akebono Bonsai Society
October 17—10 a.m.
Sunday Morning Walk*
"Tallac Knoll Aquatic Section"
Dr. Leonid Enari, senior biologist
October 24—2 p.m.
Sunday Afternoon Talk*
"Vegetable Gardening"
Ron Call, education specialist
November 7—2 p.m.
Sunday Afternoon Talk*
"Shade Plants"
John Provine, superintendent
November 13, 14—Sat., 12 to 5 p.m.
Sun., 9 to 5 p.m.
Fall Chrysanthemum Show
Presented by the Pasadena Horticultural Society
December 4, 5—9 to 5 p.m.
Camellia Show
Presented by the Southern California Camellia Council, Ltd.
*Sponsored by California Arboretum Foundation

DESCANSO GARDENS, La Canada

September 12—10 a.m.
Sunday Morning Walk*
"Rose Garden & Annuals"
George Lewis, superintendent
September 25, 26—Sat. 12 to 5 p.m.
Sun. 9 to 5 p.m.
Bonsai Show
Presented by Descanso Bonsai Society
October 10—2 p.m.
Sunday Afternoon Talk*
"Growing & Planting Bulbs"
George Lewis, superintendent
October 17—2:30 p.m.
Tea House Ten Year Anniversary Celebration
October 30, 31—9 to 5 p.m.
Chrysanthemum Show
Presented by Glendale Chrysanthemum Society
December 4 to 12—9:30 to 4:30 p.m.
Christmas Decoration Exhibit
Presented by Descanso Gardens Guild
*Sponsored by Descanso Gardens Guild

SOUTH COAST BOTANIC GARDEN

Palos Verdes Peninsula

September 19—10 a.m.
Sunday Morning Walk*
"Fall Flowering Plants"
Jeffrey Hook, education assistant
September 26—2 p.m.
Sunday Afternoon Talk*
"Outdoor Container Gardening"
Edward Hartnagel, assistant superintendent
October 17—10 a.m.
Sunday Morning Walk*
"Aquatic Section"
Edward Hartnagel, assistant superintendent
October 17—12 to 4 p.m.
"Discovery Walk, self-guided tour
Presented by Amigos del Jardin and Audubon Society
October 24—2 p.m.
Sunday Afternoon Talk*
"Vegetable Gardening"
Jeffrey Hook, education assistant
October 30, 31—10 to 5 p.m.
Bonsai Show
Presented by South Coast Bonsai Association
December 12 to 19—10 to 5 p.m.
"Holidays in the Garden"
Presented by South Coast Botanic Society
Foundation
*Sponsored by South Coast Botanic Garden Foundation

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ARBORETUM
1st Sunday of each month at 8 a.m.
DESCANSO
2nd and 4th Sunday of each month at 8 a.m.
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3rd Wednesday of each month at 8 a.m.

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Lasca Leaves

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Lasca Leaves

Published quarterly by the California Arboretum Foundation, Inc., for the Department of Arboreta and Botanic Gardens of Los Angeles County.

LOS ANGELES STATE & COUNTY ARBORETUM | DESCANSO GARDENS | SOUTH COAST BOTANIC GARDEN

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Editor
Donald S. Dimond

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department notes

HALL OF ENVIRONMENTAL EDUCATION

A GRANT OF $10,000 to be used toward the construction of the Hall of Environmental Education at the Arboretum was received last September from the Stanley Smith Horticultural Trust of London. The sum brings the total amount so far raised for the Hall well past the halfway mark on the half million dollar pledge made by the California Arboretum Foundation.

The Stanley Smith Horticultural Trust is one of the few philanthropic trusts giving aid solely to horticultural and botanical establishments. It was founded in 1970 in fulfillment of the intent of Stanley Smith, a dedicated British plantsman who had been actively planning the foundation of the trust at the time of his death in 1968. Mr. Smith had already been making generous gifts for the encouragement of horticulture on a worldwide scale, including many gifts to Kew Gardens. It was his wish that his friend and confidant, Sir George Taylor, be the director of the trust following Sir George's retirement as director of the Royal Botanic Gardens at Kew, a position Sir George had held for fifteen years. The wish was realized with the founding of the trust.

Sir George is a widely known botanist whose practical and theoretical knowledge of plants was amply demonstrated during his tenure at the Royal Botanic Gardens. Since assuming the directorship of the Stanley Smith Horticultural Trust he has approved grants for horticultural and botanical pursuits all over the world.

NEW FORMAT FOR LASCA LEAVES

AT THE REGULAR meeting of the Board of Trustees of the California Arboretum Foundation last November 16th, a recommendation from the Executive Board to incorporate *Lasca Leaves* with a new national magazine, *Garden,* was unanimously adopted.

Through the Garden Society, a nonprofit division of the New York Botanical Garden, the new magazine will initially be sponsored by the New York Botanical Garden, Fairchild Tropical Garden, Missouri Botanical Garden, and the Los Angeles State and County Arboretum. Other botanical gardens and horticultural groups are presently considering the project.

Garden will be issued six times a year. It will have a page size of 8¼ x 11 inches and each issue will have 32 pages with a full color front and back cover and at least 8 pages of full color illustrations of the highest quality available. Each sponsoring organization will have its own 8-page insert *(Lasca Leaves)* included with the 32-page core of the magazine (4 pages in front and 4 pages in back), bound within the front and back color covers. *Garden* will not only include *Lasca Leaves* but "will assemble, for the first time in this country, the human constituency of the plant world, and will be in a position to mobilize this group to support the interests of the plant sciences and their institutions, to respond on issues of public policy involving the symbiosis of plant and man, to promote wider appreciation of plant life in the amenity of our country's towns and cities, and to defend the integrity of our plant resources in garden, field, forest and natural waters."

Articles from distinguished horticulturists, ecologists, botanists, naturalists, and the related arts and sciences will serve to

broaden the readers' concepts and understanding of today's environmental problems. We invite you to join us in looking forward to our first issue of *Garden* — The Magazine of Plants and People, due in March, 1977.

DESCANSO PARTY

THE FUND-RAISING garden party held the evening of last August 20 at Descanso Gardens was a great success on all counts. Sponsored jointly by the Southern California Camellia Council and the Descanso Gardens Guild and attended by some 300 members of those organizations and their guests, the party initiated the first of many events to follow that will contribute to the construction of an exhibition, classroom, and flower show pavilion on the grounds of the gardens. The actual site will be where the present gatehouse is located, a structure that will be replaced by, and its functions incorporated into, the new building. Nancy Dunn and Mel Gum, presidents respectively of the Guild and the Camellia Council, served as co-chairmen, and, with Descanso superintendent George Lewis, greeted guests and attended to the many details that helped make the evening enjoyable. Department Director Francis Ching prepared the barbecued beef for dinner as he has for other functions.

Among the guests of honor introduced by emcee Bill Woodroof, past Camellia Council president and current member of that body's Advisory Council, were former County Supervisor John Anson Ford, Dr. and Mrs. Samuel Ayres, Jr., Mrs. Leland E. Larson, California Arboretum Foundation president, Eugene Hillman, South Coast Botanic Garden Foundation president, and Jack Danz, president of Los Angeles Beautiful and treasurer of the Descanso Gardens Guild.

Following the dinner, there were tours of the grounds, the Oriental Tea House, the Demonstration Patios, and the Hospitality House, plus dancing, a raffle, and entertainment.

BICENTENNIAL BOOK

A BOOK PUBLISHED two hundred years ago incorporating what might well be the first environmental protest has been donated to the Plant Science Library of the Los Angeles State and County Arboretum. The author is John Evelyn, an English diarist and horticulturist who, distressed at the destruction of trees in England as a result of cutting and pollution by glass factories and iron furnaces, wrote *Sylva,* described on the frontispiece as a "discourse of forest-trees, and the propagating of timber in his Majesty's dominions as it was delivered in the Royal Society on the 15th day of October 1662 . . . together with, an historical account of the sacredness and use of standing groves."

Sylva was first published in 1664. In 1776, an edited edition was published that included lengthy horticultural and botanical notes by A. Hunter, a medical doctor and Fellow of the Royal Society who was able to supplement Evelyn's work from the vantage point of a hundred intervening years of progress in botanical knowledge. It is this 649-page volume, together with about 25 other volumes, that Dr. Samuel Ayres, Jr., donated to the Arboretum last October. Dr. Ayres has, of course, been contributing to the Arboretum in one form or another for almost thirty years, or ever since he came up with the idea of creating the Arboretum in the first place. The present collection, which includes a number of books in Latin, Spanish, and Japanese, is but the most recent of his gifts which, along with the many plants he has donated, will benefit the public for generations to come.

The Christmas show at Descanso Gardens this year will have scenes like this one taken in the Hospitality House last Christmas.

DESCANSO CHRISTMAS SHOW

THE ANNUAL "Nine Days of Christmas" show at Descanso Gardens will open at the Hospitality House on Saturday, December 4, and continue through Sunday, December 12. Sponsored by the Descanso Gardens Guild as a Christmas gift to the people of Southern California, the show is free and open daily from 9:30 a.m. to 4:30 p.m. Each year this exhibit of Christmas decorations has attracted a greater number of viewers. Last year, 22,000 people came to see the creations of some 100 invited amateur and professional artists. The purpose of the show is to give visitors inspiration and ideas for making Christmas settings in their own homes.

The exhibits include outside decorations, table settings, wall hangings, uniquely decorated trees, Christmas floral arrangements, fine needlework, stain glass panels, doll houses, unusual wreaths, and other creations that express Christmas. One room is set aside each year for the display of exhibits of particular interest to children.

The ladies of the Guild will again have refreshments of coffee, cider, and cookies available in the big striped tent on the terrace. A gift shop will be stocked with garden-related items such as planters, maple candies, stoneware, garden books, notepaper containing scenes of Descanso Gardens, and a selection of Christmas gift plants. Proceeds from the sales are used for improvements in the Gardens and for subsidizing the Guild's program for Special Education Children in Los Angeles County schools.

DESCANSO BENEFIT

THE ENTERPRISING Descanso Gardens Guild has devised a "P.S." for the benefit of the Gardens, its very first effort in this category. What it is is a Patio Sale to be held next February 11th, 12th, and 13th on the patio of the Hospitality House at Descanso Gardens. Over the long weekend the public can browse through a collection of china, glassware, ceramics, jewelry, books, pots and potted plants, paintings, antiques, art objects, and some furniture. Coffee will be "on the house." Anyone wishing to contribute items to "P.S." that are suitable and salable (they will be tax deductible), is invited to call 790-5414 to arrange for pickup or delivery.

GUILD MEMBERSHIP MEETING

A LONGTIME FRIEND of Descanso Gardens, John Anson Ford, will be the guest speaker at the Descanso Gardens Guild annual membership meeting next February. It was Mr. Ford who worked out an acceptable plan for the purchase of Descanso Gardens by the County in 1953. It was he who introduced the resolution to place the Gardens under the administration of the County Department of Arboreta and Botanic Gardens, saying, "Descanso Gardens is a great educational asset to the County and I feel that it should be preserved as such."

From 1969 to 1975, Mr. Ford served first on the Advisory Committee of the Guild and then as a member of the Guild's Board of Trustees. Still remembered for his many efforts on behalf of the cultural and practical needs of the people during his 24 years as a County supervisor, Mr. Ford retains at the age of 94 his interest in horticulture and community affairs. Guild members are understandably looking forward to his appearance at their meeting.

FAIR AWARD

INVITED to place an exhibit in the Los Angeles Fair in Pomona last August, the California Arboretum Foundation responded with a combined historical and landscape setting that ended up winning first prize and a $300 award. The setting was the work of Las Voluntarias members Tootie Grivich and Ruth Brankey and staff nurseryman Earl Ross. In keeping with the Bicentennial theme, they set up a Spanish mission scene that included artifacts from the Arboretum's historical section. This provided the backdrop for about 35 hanging baskets made up of varieties of ivy, fuchsias, tradescantia, begonias, and other plant materials. Besides winning first prize, the setting attracted the interest of many Fair patrons who filled out cards requesting copies of the Foundation brochure and membership applications.

DR. MILDRED MATHIAS

THE SOUTH COAST BOTANIC GARDEN Foundation will honor Dr. Mildred Mathias, emeritus professor of botany at UCLA and honorary trustee of the California Arboretum Foundation, at a brunch, open to the public, on January 30th at the garden.

DEPARTMENT PUBLICATIONS

THE THREE GARDENS of the Department are a source of horticultural and botanical information not only within the County but throughout Southern California. In 1970, a publications program got under way aimed at supplying the gardening public with practical, sometimes technical information based on the most common inquiries and reflecting, also, the results of Arboretum field and laboratory research. The 12- to 40-page brochures have all been popular, some

extraordinarily so in special circumstances as, for example, the distribution of over twenty thousand copies of the Fire Retardant Plant brochure following a tremendous fire in the Santa Monica and San Gabriel Mountains in December 1970. Increased demand for these various publications has put a strain on the printing budget making some items in short supply. Following is a list of brochures and horticultural bulletins currently available. They can generally be obtained at the information windows at each garden, or by mail from Public Services at the Arboretum.

Beneficial Insects
Home Vegetable Gardening
Clean Air With Green Plants
Growing and Using Oriental Vegetables
Green Belts for Brush Fire Protection and Soil Erosion Control in Hillside Residential Areas
Poisonous Plants of Southern California (available in January from the California Arboretum Foundation. 50c)

Horticultural Bulletins:

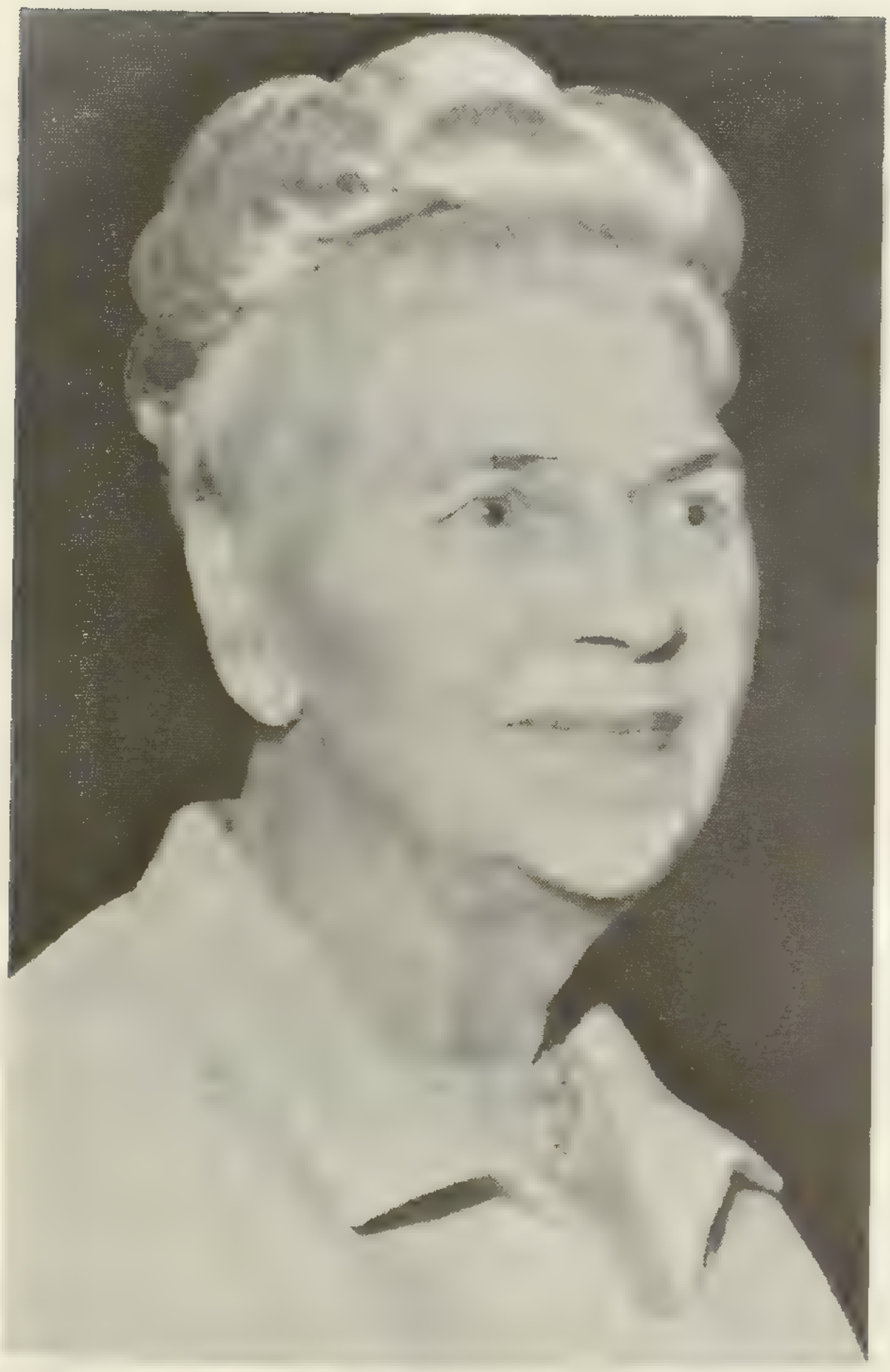
Care of Native California Oak Trees
Junipers for Southern California
Composting
Lilacs in Southern California
Azaleas in Southern California
Growing Bulbs and Bulb-Like Plants in Containers
Home Vegetable Gardening Calendar for Southern California
Mulching
Sycamore Blight
Camellias in Southern California

CHRISTMAS SHOPPING

CHRISTMAS SHOPPERS looking for items connected in one way or another with the world of plants will find a wide choice this year in the Gift Shop at the Arboretum. Under the direction of Ruth Mary Larson, Foundation president, the inventory of hardcover and paperback books has greatly increased as has the number of prints, posters and other art objects. Two outstanding books are "Exotica," the 2,000-page cyclopedia of exotic plants at $78, and "Color For the Landscape," the 200--page compendium of flowering plants edited by Dr. Mildred Mathias with striking color photos by Ralph Cornell for $10.95. There is also a comprehensive collection of Sunset and Ortho books. In the art section there is a fine selection of prints and posters, the latter from the New York Botanical Garden and the British Museum of Natural History, at $5. There is also notepaper containing scenes of the Arboretum. Handcrafts include a variety of ceramic pots with or without macramé hangers and some charming Christmas figures for as little as $1.25. The Las Voluntarias craft group will make special Christmas decorations to order in prices ranging from $25 to $45. And, as always, there is a modest but interesting collection of house plants, including, for only $2, an attractive coffee plant in an 8-inch pot.

ADVISORY COUNCIL

DEPARTMENT DIRECTOR Francis Ching was reappointed to the National Arboretum Advisory Council for a two year period beginning last July 1. The Advisory Council was included in the act that established the National Arboretum in Washington D.C. in 1927. Its function is to "counsel and advise on the most critical needs and to suggest methods of accomplishing the Arboretum's immediate and long-term objectives in the areas of research and public education." A principal achievement in the past two-year period was the acquisition of a piece of property that will enable the Arboretum to enter a new phase of development.



Valley M. Knudsen

MRS. VALLEY M. KNUDSEN

MRS. VALLEY M. KNUDSEN, founder-president of Los Angeles Beautiful, died last September 10 at the age of 81, ending a fifty-year career dedicated to community beautification. Her achievements in that period and the honors conferred on her would fill a small directory. Starting in 1919, when her husband and his brother started the creamery business that bears their name, she became involved in civic, cultural, and philanthropic endeavors. Mrs. Knudsen founded Los Angeles Beautiful in 1949 and served as president for 20 years. Initially, two main objectives were reached under her leadership: crusades for clean communities and the planting of trees in downtown streets. Later, new programs were organized to include practically everything from airports to trash containers. Mrs. Knudsen initiated working relationships with all levels of govemment toward solving such problems as billboard control and landscaping of freeways.

Her yearly appearances before the Los Angeles City Council added 10,000 new litter baskets for public use. The annual school poster contest, and the grant award winning poster urging the public to keep Los Angeles clean, were displayed in the City Hall rotunda. Mrs. Knudsen felt that awards were a powerful incentive for business and industry beautification and good housekeeping. As a result an annual business and industry awards program was organized that has since become an annual community showcase event.

During all these years, her efforts inspired other cities and commmunities to organize conservation and beautification programs and now there are more than 350 throughout the state. With her service went many honors and fine associations. She was a counselor to Mrs. Lyndon Johnson during the organization of President Johnson's Keep America Clean program; King Fredrick of Denmark bestowed two of that country's highest honors on her—the Danish Royal Service Medal in Gold with Crown and the King Christian X Liberty Medal; Loyola University at Los Angeles conferred an honorary Doctor of Laws Degree; she received the Knightly Order of Saint Brigitte for Achievement from the Ecumenical Foundation in America; and she was a member of the Advisory Board of California State University at Los Angeles and that of Pomona College. In 1971, the "Valley Knudsen Garden Residence" at Heritage Square was dedicated in her honor. Clearly, such a lady will be long remembered.

PLANT PORTRAITS

David Deardorff

Phoenix reclinata

THE SENEGAL DATE, *Phoenix reclinata,* is one of those dramatic palms which creates the romantic aura of a tropical island paradise. Because it is also relatively tolerant of cold, it can be grown throughout most of Southern California. Its tropical appearance results from a superficial resemblance to the coconut palm, although it is actually a species of date palm. Like the coconut, its trunks are slender and lean gracefully at odd angles in contrast to the majority of other palms which are usually stiffly erect. The pinnate (feather-like) leaves are a bright shining green and arch away from the crown in graceful curves. At maturity each plant resembles a grove of medium sized trees because it produces several trunks from the base. The Senegal dates' value as an ornamental is further enhanced by its small size (to 30 feet). It is only half as large as its close relative, *Phoenix dactylifera,* the true date palm.

The Senegal date is one of ten or twelve species in the genus *Phoenix.* The name of the genus is directly derived from the ancient Greek name for the date palm. Theophrastus (370-285 B.C.)

first recorded the name *Phoenix* for the date palm but the name had probably been in widespread usage for centuries. Although the exact origin of the name has been lost, it is possible that the date palms were named by association with Phoenicia, the land of the Phoenicians. The Phoenicians were the greatest seafarers of the ancient world and had ruled the Mediterranean for nearly a thousand years by the time of Theophrastus. Their homeland (modern Lebanon) and adjacent Palestine were famed for their date palms. Whether the Greeks named the country after the date palm or the date palm after the country will perhaps never be resolved. From the time of the ancient Greeks to the present, Phoenicia (the country), Phoenicians (the people who live there), phoenikes (a purple-red color), and Phoenix (the date palm and the fabled bennu bird of Egypt), are words having the same root which are inextricably woven together through history.

To the ancient Egyptians the bennu bird (the Phoenix) originally represented the creative force of Osiris, a vegetation-spirit who died with the harvest and was reborn in the spring. He was the generative life-force of wheat, grapevines and trees (date palms?). In time the agricultural cycles of harvesting and resprouting became submerged in the more abstract cycle of death and rebirth. In the course of centuries, Osiris became an aspect of the high God, beneficent lord of the dead, and by the time of Herodotus (5th century B.C.) the myth of the bennu bird had been reduced to the level of a fairy tale. The bennu bird (the Phoenix) was supposed to die only when consumed by fire and was immediately reborn from its own ashes.

The myth of the Phoenix is appropriately applied to the date palms since several species are fire adapted: All of their leaves may be burned away and their trunks blackened yet they will survive and sprout new leaves. Almost all palms have only a single growing point, the terminal bud in the crown of the tree. Thus, if the terminal bud is killed then the tree is killed. Those species which are capable of sprouting from the base, like *P. reclinata,* are particularly well adapted to survive recurrent fires because they can generate new growing points.

The older concept, that of the Phoenix as the soul or essence of a life-generating vegetation-spirit, is perhaps an even more appropriate reason why the ancient Greeks gave the same name to the date palm and to the bennu bird. The date palm is generally acknowledged to be the "tree of life" in the Garden of Eden. Even today it is literally the tree of life for millions of desert peoples. The trunk, leaves, petioles, spines, fruits and seeds provide food and shelter to men and their livestock in the hostile desert environment. An additional factor elevating the date palm to god-like status was the overwhelming magic associated with its cultivation. If the high priest did not bless the date groves with inflorescences from male trees there would be no fruit and the people might starve. The magico-religious ritual was necessary for fruit production but the ancient Egyptians and Babylonians did not know why. Today we know that all species of *Phoenix* are dioecious, that is, there are male trees and female trees. Only male trees produce pollen and only female trees bear fruit. Pollination and fertilization must occur or the female trees will be barren. When the high priest brought male flowers to the female trees he unconsciously helped to ensure pollination and a bountiful crop of fruit.

Like the date palm, *Phoenix reclinata* is an extremely important tree to the

people who live within its geographic range. It occurs throughout tropical Africa and Senegal and Ghana on the west coast to Tanzania and Kenya on the east coast, south to South Africa and Madagascar. The sap of the tree is tapped by Africans and fermented into a potent alcoholic drink. The heart of the crown, the terminal bud, or "cabbage," is eaten as a vegetable and the sweet fruit-pulp is edible though inferior to the date palm. In Kenya and Uganda the leaves are used to make baskets and sleeping mats. Strips from very young leaves are used to weave fine mats, baskets, sieves, bags, waist-bands and hats. Strong ropes are made from leaves in Senegal. The wood is resistant to termites and fungi and is used for beams, rafters, bedsteads, drums, and occasionally as fuel.

Any species of *Phoenix* is easily identifiable as a date palm because all of them have pinnately compound leaves with induplicate leaflets and the lowermost leaflets are modified into long sharp spines at the base of each leaf. The leaflets are described as induplicate because they are trough- or V-shaped as opposed to reduplicate (shaped like an upside down V). Very few palms have induplicate leaflets and only Phoenix also has spines. Although the genus is easily recognizable, it is often difficult to tell one species of *Phoenix* from another. This problem is compounded since all date palms are interfertile and hybridize in cultivation.

The inflorescence is a raceme of spikes which is enclosed at early anthesis in a rigid spathe. The small, yellowish-white flowers of *P. reclinata* are 1/2 to 2/3 inches in diameter. The fruits are about an inch long turning from green to yellow and orange to dark brown as they ripen. The fruits strongly resemble the cultivated date but are dry and have very little flesh. The seeds are about half an inch long and are deeply grooved down one side resembling coffee beans, hence one of its many common names, coffee palm.

The Senegal date is an easily grown, low maintenance, ornamental plant. Although not as hardy as *Phoenix canariensis*, mature specimens have withstood 15°F at Indio. It can be grown along the coast from Santa Barbara south, in the interior valleys, and in the desert as well. It can be grown in colder areas if it is protected when young. Small plants may be badly frost damaged at 24°F. It grows moderately fast, about a foot a year when young, and slows down as it matures. It prefers a well drained soil and will thrive when generously watered and fertilized. It looks especially nice when planted near water, whether swimming pools, garden ponds, or ocean beaches. Companion plantings of gingers, bamboo, and tree-ferns accentuate the tropical island atmosphere created by this beautiful tree. It also makes an attractive street tree when large plants are used. There is a magnificent specimen of the Senegal date just west of the main entrance to the Los Angeles State and County Arboretum. This plant has thirteen trunks, is more than thirty feet tall, and was valued at fifteen thousand dollars when it was donated to the Arboretum in 1956 by Lyman McFie, an investment house manager and amateur plantsman. Over the years, Mr. McFie made a number of lasting gifts to the Arboretum, among them an outstanding collection of paphiopedilum orchids, funds for the gateway pool that bears his name, and the Senegal date at the entrance which is seen and admired by thousands of visitors each year.

Dr. Deardorff is a member of the department research staff involved in taxonomic studies.

TEA

Leonid Enari

THE EARLY HISTORY of the tea plant *(Camellia sinensis)* and of the beverage derived from it is veiled in mystery. There are many legends in China but they can not, of course, form the bases for conclusions.

One of the legends often repeated is that the first plants in China came from the eyelids of an Indian prince, Dharma by name. According to the story, Dharma, a pious Buddhist monk and missionary, left India and travelled to China to teach the doctrines of Gautama. He vowed that he would not sleep until his mission was accomplished. One day, however, after many years of teaching, meditating and praying, he was overtaken by sleep. In holy wrath against the weakness of his flesh, he cut off his eyelids and threw them to the ground. Passing that way some time later, he noticed that the eyelids had grown into two shrubs loaded with seeds. He nibbled some of the leaves and found them to possess the power of hindering sleep. He told this to his friends. When the story spread, the people began to plant the seeds so they too could enjoy the miraculous properties of the leaves.

Dharma was a real person. The date of his visit to China is recorded in Chinese chronicles of the reign of Wei Wu as of A.D. 543. Some modern authors speculate that if Dharma ever told that story, he made it up to make the plant more attractive to his Chinese pupils.

It seems, however, that the habit of drinking an infusion or a decoction of the specially prepared leaves started in China in the fourth or fifth century, A.D. It also seems that drinking of the tea was greatly promoted by Buddhist missionaries, who found in tea a means of combating intemperance. In the eighth century, A.D., tea had become a regular industry in China, for in the annals of the T'ang Dynasty we learn of its being subjected to an imperial duty.

Marco Polo, who travelled in China in the thirteenth century, makes no mention of tea, neither the plant nor the beverage, although it is well established that the plant and its properties were as fully known then as today. In passing, it may be added here that he similarly does not report having found people in any part of his long travels drinking coffee.

Like coffee in the Near East and wine in the western world, tea is the ceremonial and social drink of the Far East. The Chinese custom of serving tea to all official and private visitors is a distinct feature of Chinese social life and etiquette. The custom originated with the Sung Dynasty (960-1280) whose rulers served tea at court on all occasions.

Tea was first introduced into Europe

very early in the seventeenth century when the Dutch began to import it into Europe from their tea plantations in Java in 1610.

The Dutch soon were overpowered by the British East India Company, which secured practically a world monoply of the tea trade. They and their American associates (the Astor, Low, Girard, Platt, Russell and Perkin families) made huge profits from the tea trade, often augmented by the illicit opium traffic to China. To get out of the monopolistic grip of the East India Company, every European colonial power tried time and again to plant tea on every square foot of their tropical land possessions, but without success.

The Dutch introduced tea to New Amsterdam in 1650, the first importation of tea into North America. It may be interesting to mention here that when tea was first used in Salem, Massachusetts, it was boiled in an iron kettle, the liquid drained off and consumed as a beverage and the leaves eaten with butter and salt as food.

From 1660 to 1689, the prepared beverage was taxed in England at the rate of 8 pence per gallon. Beginning in 1689 a duty of 5 shillings per pound was levied plus 5 percent ad valorem. The taxes were gradually increased until about 1770 when they totaled 119 percent of the original value. It will be recalled that at that period the tax on tea figured in certain disturbances in the British colonies which reached their peak when a raiding party in Indian disguise under the direction of Samuel Adams, leader of the Sons of Liberty, boarded the British East India Company ships in Boston Harbor and dumped their cargo, tea, overboard.

The English word "tea" comes from the Chinese "te" or "theh" used in some of the Chinese dialects in place of the more universal "cha." It was originally pronounced like the Chinese tay, hence Alexander Pope in his "Rape of the Lock" (1712), rhymes it with obey.

The tea plant is related to and belongs to the same family as the well-known common garden camellia *(Camellia japonica)*. Linneus in his Species Plantarum, 1753, described the tea plant under the name *Thea sinensis*. The modern botanists, however, consider the plant to be a member of the genus *Camellia* and list it as *Camellia sinensis*.

The plant is an evergreen tree to 45 feet in height. The leaves are ovate-lanceolate, serrate, petioled and alternate. They are glabrous and glossy on the upper surface but sparsely hairy on the lower surface, particularly when young. The flowers are white, approximately 1 or $1\frac{1}{2}$ inches in diameter, short-pedicelled and axillary. They occur solitary or in 2- to 4- flowered clusters. Each flower has 5 to 7 sepals, 5 to 7 petals, numerous stamens and 1 pistil. The outer stamens and the petals are united for a short distance at the base. The fruits are 3-lobed, 3-celled, 3-seeded, approximately 3/5 or 4/5 of an inch in diameter and open by 3 valves. They take 9 to 12 months to mature.

Tea plants can be divided into two principal groups, which are usually referred to as Chinese and Indian or Assam varieties. The Chinese variety has smaller leaves, solitary flowers and is usually a shrub. The Indian variety has larger leaves, 2-to 4-flowered clusters and develops, if allowed to grow, into a fairly substantial tree. These two types of plants may have had separate origins. The Chinese type may have had its origin in China itself, whereas the Indian type probably originated from wild plants near the source of the Irrawaddy River, in Assam or northern Burma. The Chinese variety is more resistant to cold and adverse conditions but rather low yielding. It is the Indian variety from which most

of the strains have been developed and grown on a large scale.

Tea grows best in the subtropics and the mountainous regions of the tropics where the temperatures are equable and

CAMELLIA SINENSIS

Drawing by Patty Lawson

rainfall moderate to high. Mean minimum temperatures should not fall below 55°F nor mean maximum temperatures go above 85°F. Rainfall below 45 inches per annum is marginal and should not fall below 2 inches per month for any prolonged period.

Commercial tea is derived from the leaves of the tea plant. Only the bud and the first two young leaves at the end of each twig, or so-called flush, are really desirable, although the third and even fourth leaves are used in inferior qualities. Harvesting the terminal buds and the adjacent two leaves together is called "fine plucking" and constitutes the finest tea. Including the third leaf is "medium plucking;" inclusion of the fourth leaf is "coarse plucking."

The leaves are processed into various classes of teas from which the black and green tea are the best known. The black tea is fermented, the green tea is unfermented. The manufacture of black tea, which forms the bulk of the tea appearing on world markets, is done in factories set up on the tea plantations.

The green leaf brought in from the field is spread on tightly stretched hessian or nylon net stretched on banks of wire frames in open lofts or in rooms where ambient or warm air is blown over the leaves. The process of withering is a very important one in tea manufacturing. If well carried out, the amount of tea enzyme, which afterwards causes the change in the leaf, nearly doubles in quantity during the operation. When the right degree of withering has been obtained, the leaf is rolled. The object of rolling is to break down the size of the leaf and to rupture the leaf cells. The rolling machine has a similar effect to rubbing the leaf between the palms of the hand, which was the primitive method.

After rolling, the leaf is spread on trays for a period of about four hours during which time the leaf changes color to a dark copper and the typical aroma develops. The change in color is similar to that which occurs when an apple is cut and exposed to air. This is known as fermentation.

After fermentation, the leaf is dried in a machine which drives off excess moisture and crystallizes the fermented juice to produce the black tea familiar to tea drinkers all over the world. When the housewife subsequently brews a pot of tea, these crystals dissolve. It is essential that boiling water is used because these crystals will not dissolve properly in water that is not boiling.

The dried tea is graded, and packed for export in plywood chests lined with aluminum foil. Principal grades in use at present are Broken Orange Pekoe, Orange Pekoe, Pekoe, Broken Pekoe Souchong, Pekoe Souchong, Broken Tea and Souchong. The Broken Orange Pekoe is considered the best. It is a curly, fine tea with as many tips (buds) in it as possible and without flat pieces. In addition, there is a grade known as "Fannings," composed of the very small and light fragments of leaf not capable of being placed under any of the grades listed, and Dust, an extremely fine grade derived from being passed through a fine-mesh sieve.

The various grades are usually blended in the consuming countries and a blend usually consists of grades from various tea plantations and usually from more than one country.

In addition to the regular commercial blends, some food markets feature in their gourmet sections teas imported from China, Taiwan, India, Ceylon and other countries.

Tea contains from 2 to 5 percent caffeine together with tannins and volatile oils. When tea is made with hot water, the caffeine and the oil readily dissolve out, and the resulting beverage has a stimulating effect and a characteristic taste and aroma. If the tea is steeped for a longer period, the tannins dissolve and the beverage becomes bitter.

Persons switching from coffee to tea for reasons of health may not realize that a cup of tea contains as much caffeine as the same size cup of instant coffee. There are 95 to 120 milligrams of caffeine in an 8-ounce cup of tea. When ingested day after day, large doses of caffeine, say more than 250 milligrams, can cause nervousness, irritability, lethargy, insomnia, headaches, palpitation, rapid heartbeat, nausea, vomiting and diarrhea.

The English-speaking peoples usually drink their tea with sugar, some adding milk or cream or a slice of lemon. The people of the Orient almost never use sugar in their tea.

India is the leading tea-producing country, followed by Sri Lanka (Ceylon), China, Japan, Russia, Indonesia, Pakistan and Taiwan. Together they produce over 2,000 million pounds of tea a year.

The United Kingdom, on the other hand, is the largest consumer of tea, taking more than half of the worlds' exports. The second largest importer is the United States, followed by Australia, Iraq, Egypt, Canada, South Africa, Morocco and the Netherlands.

Per capita consumption of tea in the United Kingdom is nearly 10 pounds per year and in the United States only 0.17. It is interesting to note here that just as England started out to be a nation of coffee drinkers, America started as a nation of tea drinkers. By the mid-twentieth century, the tea and coffee habits of the two countries were reversed. On a per capita basis, England drank 5 times as much tea as coffee, and the United States drank about 25 times as much coffee as tea.

The tea plant can be seen at the Los Angeles State and County Arboretum in 0/10 (north of the Herb Garden). At Descanso Gardens it is planted close to the Japanese Tea House.

Historic Restoration

Sandy Snider

AS A MAN of horticultural vision, Dr. Samuel Ayres, Jr. had investigated the old "Lucky" Baldwin homeplace in post-war Arcadia and seen in it the future Los Angeles State and County Arboretum. Mrs. Richard (Susanna Bryant) Dakin, historian, and one of the original incorporators of the administrative California Arboretum Foundation, also investigated, and she too had a vision. "The buildings were all going to ruin," Dr. Ayres had observed. "They hadn't had any protection for a long time and were a horrible mess." Concerned lest this bit of history go to permanent ruin, Mrs. Dakin in 1948 suggested and secured the establishment of a Historical Committee under the auspices of the Foundation to plan, promote, and oversee the restoration of the Arboretum's dilapidated historic buildings.

An all-star roster of experts and concerned citizens, co-chaired by Mrs. Dakin and Mrs. John (Georgina Hicks) Mage, held its first meeting March 19, 1949, on the porch of the Hugo Reid Adobe. There, in the words of Committee Secretary (and noted California historian) W. W. Robinson, Mrs. Dakin explained "who was who and why." And within a short two years, the distinguished Committee "who's whos" demonstrated the "why" of their selection with a master plan for restoration of the historical section that encompassed not only historical research, but also structural examinations landscape consultations, archaeological investigation, and financial considerations.

The latest of the three extant historic structures to be built was the first to be restored—the Queen Anne Cottage had not been inhabited (by humans) since the death of "Lucky" Baldwin in 1909. "It had been neglected for many years," wrote caretaker Dewey Nelson, "and had a forlorn and desolate look . . . Nestled among the tall trees that crowded it close, it faced the elements bravely. There were no sagging roofs or crumbling chimneys to be seen . . . The sum-

mer sun and winter rain had only served to mellow the place, and give it an outer charm. The interior told a different story, however; here time and vandalism had been busily at work. The glass in practically every window was broken—there were no doors, and where the fireplace mantles had been, nothing but yawning soot-covered holes in the wall to be seen. The walls themselves were a somber gray, and the floors and thresholds worn by the tramping of many feet. Bats and owls used the darkest recesses for daytime hide-a-ways, and evidence of other animal intrusions was often visible."

Preliminary architectural and engineering reports were much more specific, revealing that even the "outer charm" of the old wood structure had hidden enemies. "Foundations are in good condition with the exception of settlement cracks," read the structural engineer's initial report in 1951. "However, the porch floor construction is in an unsafe condition entirely around the building due to dry rot, fungus, and termites . . . Roof construction is generally sound" . . . but "the tower is in dangerously bad condition . . . shows evidence of water damage and dry rot."

Spurred by the challenge of the Cottage, the Historical Committee intensified its fund-raising program (an eventual $75,000 in privately solicited funds was spent), hired Philip Gresham as general contractor to carry out a structural restoration, and appointed Committee member Maurice Block, former curator of the Henry Huntington Art Gallery, to direct the interior restoration and refurnishing. Today the Queen Anne Cottage is recognized as California Historic Landmark #367, testimony to the concern, labor, and professionalism of these two men and the many who worked with them.

"Philip Gresham, as contractor, deserves great credit for his painstaking attention to authentic detail and for his selection of carpenters and painters who worked a year and a half on the job," wrote Susanna Dakin. The minutes of the May 9, 1952, Committee meeting explain in more detail: "Mr. Gresham, the contractor, spoke with enthusiasm for what had been accomplished, told of how he found the tower and its condition now . . . 'If nothing had been done,' he said, 'the building would not have stayed up another year and the tower would have fallen during the recent earthquake.' The tower has now been righted, timbers restored, roof shingled in the original style, and the bees coaxed out leaving behind some 75 lbs. of honey."

With the structure secure, exterior and interior details and color were established by Maurice Block through the aid of written description, scraping, and calculated approximation, and a refurnishing plan instituted that would reflect the Mark Twain observation that "the best is none too good for Baldwin." "Intended exclusively for entertainment, the cottage would have been rather elaborately and colorfully furnished," surmised Mr. Block. "There should be a certain gaiety about it," he continued, "It should have an atmosphere of expectancy—as if living creatures might appear in it at any moment." To create a focus for the refurnishing, the Cottage's original fireplace mantles and tiles, its handsome black walnut doors, and the English stained glass windows were secured from the Coach Barn where they had been stored by Anita Baldwin after the death of her father. Cleaned and re-installed, these integral building parts were soon complemented by donations and purchases of period Victoriana (the original Baldwin furnishings had long since disappeared and had to be replaced with articles of similar vintage and taste).

On May 18, 1954, a structurally sound,

View of Queen Anne Cottage after being vacant for 40 years and shortly before restoration was started.

appropriately furnished Queen Anne Cottage was formally dedicated as a state historic landmark, with due recognition and appreciation going to the hard-working Historical Committee who had originated, planned, financed, and carried through the project. State recognition of the group's abilities, in fact, became a key factor in the California Legislature's later (mid 1950's) decision to include the Arboretum in a statewide dispersal of impounded tideland oil funds. Under the official auspices of the Division of Beaches and Parks Architectural Division, $102,000 was appropriated for restoration of both the Baldwin Coach Barn and the Hugo Reid Adobe. Ever alert, the Historical Committee was waiting with open hands, open minds, and decisive plans.

The Coach Barn, originally constructed in 1879 by "Lucky" Baldwin, was the first building restored with State monies. State restoration supervisor, Orvel Johnson, wrote that the barn "was fairly well preserved; however, extensive work was required in replacing deteriorated wood. A new roof was needed and a considerable amount of 'gingerbread,' doors, windows and other intricate building parts had to be replaced. Many coats of paint, applied over the years, were removed.

The original red and white colors were found and the building refinished to its original splendor." New roof shingles were made especially for the restoration, roof rafters and support beams were impregnated with fireproofing materials, new timbers and wall studs went in throughout the structure to insure future solidity, and original interior walls of alternating redwood and Port Orford cedar slats were carefully hand-scraped and re-nailed to the new studding to reflect the barn's rustic grace.

The year-long restoration was completed May 4, 1958 (at a cost of $79,000), and was soon after enhanced by the addition of an original barn occupant. The "Tally-Ho," an English coach drag four-in-hand purchased by "Lucky" Baldwin at the 1876 Philadelphia Exposition, was returned to its one-time home through the generosity of the Baldwin heirs. Completely refurbished by inmates at the Soledad Prison Training Facility, who put in 1,864 hours on the project, the Tally-Ho was stripped (from dull black), repainted in its original royal blue with red trim colors, and re-upholstered in plush English blue velvet.

As the Queen Anne Cottage and Coach Barn restorations reflected the late Victorian "Lucky Baldwin" era, so too, the Historical Committee hoped, would the Hugo Reid Adobe restoration reflect the Mexican California life-style of the first private owner of Rancho Santa Anita. With the remaining state money (plus a supplemental $115,000), the Committee implemented a plan that had been the object of study and often sharp disagreement from as early as 1950. The controversy revolved around the fact that the Reid adobe had undergone so many transformations by later owners (culminating in "Lucky" Baldwin's 1879 renovation) that the location, dimensions, and quality of the "original" house were relatively obscure. "The building that

Scaffolding set up for repair of roof of Coach Barn, part of year-long restoration completed in 1958.

stood on the site when work was begun had been remodeled several times," wrote restoration expert Orvel Johnson. "A wood frame unit had been added, interiors changed, a tile roof added and many other innovations. Just how much of the adobe wing was original was difficult to determine. There were actually three types of adobe block used and just as many types of construction."

The minutes of the sixth meeting of the Historical Committee (January 1950) indicate the decision-making process. "The detailed layout of the Historical Preserve, as part of the Arboretum's Master Plan, was exhibited and explained by Mr. Bent. He pointed out that basic surgery is necessary rather than the preservation of antiquities. To reconstruct the frame addition would require an 80% restoration, because of termite damage and other deterioration. Accordingly, the Committee recommended as fundamental the tearing down of the Baldwin wing and the putting in its place of a functional adobe wing of the Reid period . . . All members expressed themselves as unanimously in favor of bringing back the adobe age in line with Mr. Bent's views, considering it a glorious opportunity to restore the Reid manner of living."

Expert research, both historical and archaeological, was begun in 1956 in an effort to determine as nearly as possible the original appearance of the Reid adobe. Maps, deeds, letters, and journals were all carefully perused to no avail — apparently no written description of the adobe was ever recorded. Archaeological exploration proved much more fruitful, however, as members of the U.S.C. Department of Anthropology and the Archaeological Research Associates organization spent nearly a year and a half unearthing adobe brick foundations and other evidences of the original building.

Actual reconstruction began in 1958. "As much of the original building was saved as possible," wrote Orvel Johnson. "Eroded blocks were repaired and new blocks were placed where blocks were missing or beyond repair. More than 15,000 adobe blocks for the building and courtyard wall were made from soil right on the site. Blocks were authentically molded; straw was added as a binder and the finished blocks stacked in the sun to dry. The roof was constructed of aronda cane, laid tight and laced to alder poles with rawhide. Roof beams, door and window lintels, jambs, thresholds and other wood members were all hand hewn." With private funds, furnishing of the adobe was accomplished by the Pasadena Committee of the National Society of Colonial Dames of America (under the professional guidance of Gregor Norman-Wilcox of the Los Angeles County Museum), and on Cinco de Mayo, 1961, the Hugo Reid Adobe was formally dedicated as California Historic Landmark #368.

The latest chapter in the Arboretum's restoration story belongs largely to the citizens of Arcadia and is entitled "Save the Depot." Since its closure by Santa Fe Railroad in 1940, the brick, Gothic Revival Santa Anita Depot had stood neglected on the north side of Colorado Boulevard, a haven for vagrants and a playground for daring youngsters. The deteriorating structure had withstood many trials since its erection in 1890, but it faced its strongest enemy in 1967 when it was announced that the new Foothill Freeway would be routed directly through the Depot site. At this juncture, "Save the Depot" became a rallying cry for the Arcadia Historical Society and the Arcadia Chamber of Commerce, as, post-haste, arrangements were made to relocate the old building within the Arboretum's Historical Preserve. County coffers were not open to finance the move,

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however, so a fund-raising campaign was begun in a community-wide effort to save a piece of the area's history. Over $30,000 was collected to dismantle, move (brick by brick), and rebuild the Depot; hours of free labor were expended in painting, plastering, and woodworking; and, as the September 25, 1970, dedication date neared, family treasures and memorabilia were generously donated to refurnish the station in authentic turn-of-the-century style.

Today, due to the interest, the generosity, and the perseverance of concerned citizens past and present, the Arboretum has become a microcosm of California history. Preservation and reconstruction have enabled this and future generations to step back in physical as well as mental time, from the days of the Mexican rancheros to the flamboyance of the Victorians. By providing the means for first-hand historic interpretation, the facts of history have been given a depth not easily achieved in books and the observer given an added appreciation of his California heritage.

Sandy Snider is an assistant in the historical section at the Arboretum.

Plants For A Contained Atmosphere — Begonia ficicola

John Provine

BEGONIA FICICOLA is a rhizomatous begonia with yellow flowers which have orange buds. Its foliage is a lush green with a pebbly texture that has hairs on the pebbles. The plant is grown both for its foliage and flowers.

The original plant was found in tropical Africa in the country of Cameroon near Kumba. It was growing on a fig tree near a waterfall.

It was introduced to the United States in the 1950's but is still rare in this country because there are few sources and few people have learned how to grow it.

In Southern California it must be grown in a greenhouse or a contained atmosphere. The following steps should help you to grow it:

1. Select a large, clear glass or plastic bowl—12-inches or larger (one pictured is in a 14-inch bowl).
2. Clean the bowl thoroughly with detergent and rinse with bottled water.
3. Cover the bottom of the container with chips of charcoal to allow for drainage.
4. *Begonia ficicola* is an epiphyte; therefore, a soilless mix is preferred. The Arboretum prefers one-half peat moss and one-half perlite. This is a light-growing mix and will allow for necessary drying. Only about one inch of growing mix is needed to support the plant. Add moist growing mix to the bowl.
5. Plant begonia in the growing mix.

Begonia ficicola

6. Cover your container with a lid or saran-type wrap.
7. Selecting a place in the home or office is one of the most important steps. Without the proper light, the plant will not bloom. *Begonia ficicola* needs lots of light but not direct sunlight. (The one pictured is grown in a north window.)
8. Another very important step is watering. As the container lacks drainage, distilled water should always be used. A cooking baster should be used by pointing the open end against the glass so that water will run down the inside of the container thereby preventing water on the foliage and splashing the soil on the side of the container. Let the water sit so the growing mix can soak up the water, then tilt the container slightly and take the baster and pull off the excess water.

If *Begonia ficicola* is not watered correctly, it rots easily. Do not get water on its foliage.

The Arboretum's soil mixture will turn a lighter color when the growing mix is dry. Also, when the leaves turn silverish in color, the plant has become too dry. On hot days, as the temperature of the house or office gets warmer, the temperature inside the bowl will likewise get warmer. To correct this, pull back the lid to allow the temperature to adjust.

Begonia ficicola can be grown from a leaf cutting. Plants are available from Kartuz Greenhouse in Wilmington, Massachusetts (mail order), or Ziesenhenne Nursery in Santa Barbara, California.

This is another in a series of articles on plants for a contained atmosphere by Mr. Provine who is superintendent of the Los Angeles State and County Arboretum and a specialist in this type of planting.

View of the Prehistoric Garden at the Los Angeles State and County Arboretum.

An Arboretum is for people . . .

One of the great attractions of the Los Angeles State and County Arboretum is the opportunity it affords for the study and enjoyment of different environments. For example, within its 127 acres are tropical, aquatic, and jungle-like environments each distinctive in character and suggestive of faraway places.

Recently, a prehistoric garden has been developed. Here, visitors may look back millions of years in time at cycads, ferns, ginkgos, and other plants that have survived through the ages in relatively unchanged form.

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MELALEUCA TERETIFOLIA (Cover)

Southern California has been enriched with many members of the bottlebrush family from Australia. The Arboretum has in the past several years introduced to the landscape many members of this group. The newest introduction is **Melaleuca teretifolia,** a tall, erect, evergreen shrub with long, rigid branches, somewhat open in its growth habit, and reaching a height of ten feet or more. Leaves are linear-subulate, alternate, smooth, rigid, approximately two inches in length. The pine-like foliage is yellowish-green in color. Flowers are white, rather small, in sessile axillary or lateral clusters, and when in full bloom during the late summer and early fall appear to be laden with snow.

Melaleuca teretifolia thrives in full sun and will grow in a variety of soils, making it an ideal plant for around the home or even in hillside situations since it requires very little care. All together, the bottlebrush group provides the home-owner with a wide range of plants to select from to provide flowers at a time of year when very little else can be found. There are no known insect or disease pests and fertilizer and water requirements are minimal. **Melaleuca teretifolia** is indigenous to Western Australia where it grows mostly in sandy areas.

ARBORETUM WEATHER

Lat. 34d 08' 48" N.
Long. 118d 02' 59" W.
Elev. 571.28 ft.

Weather season:
Oct. 1 to Sept. 30

	Aug.	Sept.	Oct.
Average daily maximum temperature	91.1	83.1	84.9
Average daily minimum temperature	58.7	62.6	56.4
Highest temperature	109	100	100
Lowest temperature	55	56	48
Number of clear days	20	5	20
Number of partly cloudy days	11	14	8
Number of cloudy days	0	12	5
Rain during this month	.10	5.21	1.51
Total rain since Oct. 1st	9.98	15.19	1.51

Calendar

December, January, February, March

ARBORETUM, Arcadia

December 4, 5—9 to 5 p.m.
Camellia Show*
Presented by the So. Calif. Camellia Council

January 14—8 p.m.
Theodore Payne Foundation Lecture**
"California Plant Communities"
Dr. Robert F. Thorne, taxonomist, curator, Rancho Santa Ana Botanic Garden

January 15, 16—Sat. 3 to 5 p.m.
Sun. 9 to 5 p.m.
Iris Show*
Presented by S. Calif. Iris Society

January 29, 30—9 to 5 p.m.
Bonsai Show*
Presented by Baikoen Kenkyukai Bonsai Society

January 30—10 a.m.
Sunday Morning Walk
"Greenhouses"
Tim Lorman, staff horticulturist

February 6—2 p.m.
Sunday Afternoon Talk
"Container Gardening"
John Provine, superintendent

February 19, 20—9 to 5 p.m.
Camellia Show*
Presented by Temple City Camellia Society

March 18—8 p.m.
Theodore Payne Foundation Lecture**
"Bulls, Birds, Botany and Bugs"
Mrs. Roy Fetterman, photographer-conservationist

March 20—2 p.m.
Sunday Afternoon Talk
"Exotic Economic Plants"
Dr. Leonid Enari, senior biologist

March 26, 27—9 to 5 p.m.
Aril Show*
Presented by Aril Society International

*Sponsored by California Arboretum Foundation

DESCANSO GARDENS, La Canada

December 4-12—9:30 to 4:30 p.m.
Christmas Decoration Exhibit
Presented by Descanso Gardens Guild

January 8—1 p.m.
Rose Pruning and Planting Demonstration
Presented by Descanso staff and Pacific Rose Society

January 21—8 p.m.
Theodore Payne Foundation Lecture**
"Wild Flower Trips"
Herbert M. Elkins, photographer
Nature Conservancy Board

February 1—
New Guild Research Library opens

February 11, 12, 13—
Patio Sale, Hospitality House
Presented by Descanso Gardens Guild

February 27—10 a.m.
Sunday Morning Walk
"Camellias, Flowering Trees and Shrubs"
George Lewis, superintendent

March 12, 13—Sat. 1 to 5 p.m.
Sun. 9 to 5 p.m.
Camellia Festival*
Presented by So. Calif. Camellia Council

March 25—8 p.m.
Theodore Payne Foundation Lecture**
"Indian and Early Uses of California Natives" Mrs. Dorothy Pool, consultant, Environmental Education

March 26, 27—9 to 5 p.m.
Daffodil Show*
Presented by S. Calif. Daffodil Society

*Sponsored by Descanso Gardens Guild

SOUTH COAST BOTANIC GARDEN
Palos Verdes Peninsula

December 12-19—10 to 5 p.m.
"Holidays in the Garden"
Presented by South Coast Botanic Garden Foundation

January 16—2 p.m.
Sunday Afternoon Talk
"Pruning Deciduous Trees"
Armand Sarinana, superintendent

January 30—
Brunch to honor Dr. Mildred Mathias*
call 377-0468 for reservations

February 11—8 p.m.
Theodore Payne Foundation Lecture**
"Unusual Hybrids of Monkey Flowers—Mimulus and Diplacus"
David Verity, Botanist, Herbarium and Botanic Garden, UCLA

March 27—10 a.m.
Sunday Morning Walk
"Lawns and Groundcovers"
Armand Sarinana, superintendent

March 30—
Demonstration on Flower Arranging*
Amelia Ascher
Tickets required

*Sponsored by South Coast Botanic Garden Foundation

**Presented in cooperation with the Department of Arboreta and Botanic Gardens

BIRDWALKS

ARBORETUM
1st Sunday of each month at 8 a.m.

DESCANSO
2nd and 4th Sunday of each month at 8 a.m.

SOUTH COAST
3rd Wednesday of each month at 8 a.m.